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Some Effects of a High Manganese Content in the Diet of Animals, with special reference to Lactation Tetany

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Earlier studies on lactation tetany of cattle have revealed that the disease in Lincolnshire is localised to certain districts and Blakemore and Stewart (1935) have shown that on farms in this area where lactation tetany commonly occurs, there is a fall in the magnesium level of the blood when the cows are first turned out to pasture in the spring, and that the normal level is regained five or six weeks later. These changes occurred in apparently normal animals as well as in animals which later succumbed to the disease but they were not seen in cows on farms free from lactation tetany. The authors suggested that there must be some peculiarity of the pasture which produced the fall in the blood magnesium level but they were unable to attribute this to any deficiency in the magnesium content of the grass on such farms. In fact, the magnesium content of grass from several farms on which lactation tetany frequently occurs was higher than that of grass from unaffected farms. Moreover, the nutritive value of grass from affected farms was not abnormal.

Seekles and Sjollema (1932) found a high concentration of potassium nitrate, 2 per cent. dry weight, in grass from certain pastures on which cases of lactation tetany had occurred and they carried out experiments to determine the effect of the continued administration of this substance on the mineral constituents of the blood of cattle. They were able to produce alterations in the calcium, inorganic phosphorus and magnesium content of the blood by this means and came to the conclusion that it was the presence of the nitrate which was responsible for producing the changes. These, however, did not resemble those seen in lactation tetany. This and earlier work (Sjollema, 1930), led Seekles and Sjollema (1933) to study the protein present in young grass and certain feeding cakes, but although they were able to produce extracts of these substances which caused alterations in the ratio of the mineral constituents of the blood of cattle, in no case were symptoms of tetany produced; nor could there be found in young grass any specific substance of a protein nature which could be held responsible for producing such changes. Their inclination was to ascribe them to some intoxication from the gastro-intestinal tract.

In spite of these findings, the authors of the present paper became more strongly convinced that the pastures themselves were in some way connected with the aetiology of lactation tetany in Lincolnshire and it was decided to carry out more detailed chemical and botanical examinations of pastures on affected farms. This was accomplished in the spring and summer of 1935 and 1936. It was realised that to undertake a comprehensive study of the aetiology of lactation tetany would be too big an undertaking in the time available, but, since all writers are agreed that one of the salient features of this disease is a fall in the magnesium level of the blood, it was thought that if the cause of this fall could be established an important step would have been taken.

For the purposes of this paper, lactation tetany may be defined as hyperexcitability of the neuro-muscular system associated with a lowered blood magnesium level, usually but not invariably affecting lactating cows.

PASTURE EXAMINATION

A preliminary survey of affected farms showed that in Lincolnshire, lactation tetany sometimes occurs on the marshlands but more usually on the high-lands which are sharply marked off from the fen-lands where the disease is unknown. In Northamptonshire, where an investigation was also made, the affected areas, although limited in extent, were not well defined. The type of soil possessed by farms examined in these counties varied considerably, greensand, silt or heavy clay being the most common

*In accordance with the custom of the Institute, the names of the collaborators are arranged in alphabetical order.

and a limited examination of affected farms in Herefordshire, revealed that here old red sandstone predominated. In general, therefore, there is little or no connection between the type of soil and the distribution of the disease.

A botanical analysis of seven affected farms in Lincolnshire revealed that the main grasses were Yorkshire Fog (*Holcus linatus*), Sweet Vernal Grass (*Anthoxanthum odoratum*), Yarrow (*Achillea millefolium*), Floating Foxtail (*Alopecurus geniculatus*) and Fiorin (*Agrostis alba*). It may be mentioned that *Holcus linatus* was found in abundance in every field in which cases of the disease had occurred and this no doubt has given rise to the popular belief held in the district that this grass is responsible for producing the disease. On unaffected farms, the soil seemed to be of richer quality and better grasses predominated. A great difference in the amount of grass available in the early spring was noticed on affected and unaffected farms as on the former the grasses grow more quickly in the early part of the year. It may be said, therefore, that lactation tetany is generally associated with pastures growing poor types of grasses though the actual amount of grass available is usually high.

Chemical analyses of grass samples from affected farms did not show any organic abnormality but on ashing the grass it was noticed that the ash was intensely green in colour and, on testing this, large quantities of manganese were demonstrated. It was then decided to analyse grass samples from affected and unaffected farms, since little is known about the amount of manganese normally present in grass.

Bolin (1934) found that the average manganese content of pure varieties of grasses varied between 20·75 and 4·64 mg. per 100 grm. dry matter and Richards (1930) stated that the average manganese content of five samples of pasture grass from the South of England was 12·7 mg. Mn per 100 grm. dry matter, but in a private communication she informed the authors that values as high as 66 mg. Mn per 100 grm. dry matter had since been obtained. There is reason to believe, however, that with these samples no special precautions were adopted to ensure that the grass was entirely free from soil. Therefore, steps were taken to ensure that the grass samples analysed in this investigation were absolutely free from all contaminating material. The method of Richards (1933) was used for the colorimetric determination of manganese and the results are given in Table I.

The striking difference in the manganese content of the two types of pasture led the authors to examine the manganese content of the blood of cattle which grazed upon them and the results are shown in Table II.

TABLE I: MANGANESE CONTENT OF PASTURES.

A. Grass from pastures on which lactation tetany commonly occurs.

County.	Farm.	Milligrammes Mn per 100 g. dry matter.		
Lincolnshire	1	56 mg. on 8/5/35	60 mg. on 5/7/35	54 mg. on 16/4/36
„	2	76 „ „	64 „ „	62 „ „
„	3	80 „ „	71 „ „	78 „ „
„	4	54 „ „	62 „ „	89 „ „
„	5	132 „ „	99 „ „	121 „ „
„	6	90 „ „	71 „ „	—
„	7	61 „ „	77 „ „	—
Northamptonshire ...	1	54 „ 14/9/35	—	—
„	2	62 „ „	—	—
Herefordshire	1	57 „ 1/10/35	—	—
„	2	58 „ „	—	—

B. Grass from pastures on which lactation tetany has never been recorded.

County.	Farm.	Milligrammes Mn per 100 g. dry matter.		
Cambridgeshire	1	9·2 mg. on 8/5/35	10·3 mg. on 5/7/36	5·2 mg. on 16/4/36
„	2	8·1 „ „	4·1 „ „	10·6 „ „
„	3	4·3 „ „	6·2 „ „	7·5 „ „
„	4	7·1 „ „	5·4 „ „	9·2 „ „
Lincolnshire	8	4·1 „ „	3·8 „ „	—
„	9	2·6 „ „	4·9 „ „	—
„	10	5·8 „ „	7·1 „ „	—
„	11	6·5 „ „	2·1 „ „	—
Northamptonshire ...	3	2·6 „ 14/9/35	—	—
„ ...	4	1·6 „ „	—	—
Herefordshire	3	7·8 „ 1/10/35	—	—
„	4	6·5 „ „	—	—

Table II: Manganese Content of Blood.

A. Lactation Tetany Free Area.

County.	Farm.	Cow.	Blood Manganese of cows at pasture.
			Per cent.
Cambridgeshire	1	1	0·0014 mg.
„	1	2	0·0015 „
„	1	3	0·0018 „
„	1	4	0·0015 „
„	1	5	0·0096 „
„	1	6	0·0014 „
„	1	7	0·0012 „
„	1	8	0·0018 „

B. Area in which Lactation Tetany Commonly Occurs.

County.	Farm.	Cow.	Blood Manganese.	
			Before being turned out to pasture.	Twenty days after being turned out to pasture.
			Per cent.	Per cent.
Lincolnshire	1	1	0·0008 mg.	0·1736 mg.
„	1	2	0·0014 „	0·2604 „
„	1	3	0·0004 „	0·0840 „
„	1	4	0·0016 „	0·1800 „
„	1	5	0·0012 „	0·0972 „
„	1	6	0·0015 „	0·1642 „

It will be seen that whereas the average blood manganese level for eight cows grazing on the Institute farm was 0·0025 mg. Mn per 100 c.c. serum, six cows which had been grazing for 20 days on pasture with a high manganese content, possessed an average level of 0·1599 mg. Mn per 100 c.c. serum although before being turned out to grass, this figure was 0·0015 mg. Mn per 100 c.c. serum. (The figure 0·0025 mg. per 100 c.c. serum agrees with that given by Urechina, Pamfil and Retzéann (1934) who stated that it ranged from 0·001 mg. to 0·003 mg. in 39 blood examinations.) It seemed, therefore, that the grass with a high manganese content might be responsible for causing the rise in the blood manganese level of these animals, more especially since they were receiving no other food at the time. There is the possibility, however, that for some unknown reason they may have been drawing on some reserve store of manganese in the body. This was considered unlikely and the findings appeared to justify an attempt to link the presence of large amounts of manganese in the grass with other physiological changes. Since the work had been undertaken primarily to study some aspects of the aetiology of lactation tetany, it was decided to determine the effect of manganese on the blood magnesium level.

The Effect of Manganese on Blood Magnesium

Preliminary experiments were carried out on rabbits which received varying doses of manganese chloride by means of a stomach tube. Blood samples were taken from a marginal ear vein immediately before and at varying times after dosing, or if the animal had collapsed and death appeared imminent, the chest was opened and the blood sample taken directly from the heart. The minimal lethal dose of manganese chloride for rabbits was found to lie between 1·25 grm. and 1·50 grm. per kg. body weight and it was noticed that with large doses, the magnesium level of the blood rose above the original figure whereas it fell below this figure when sublethal doses were given. The results of these experiments are given in Table III.

Table III: Rabbits. $MnCl_2$ per Os.

Weight.	Actual Dose	Dose per kg. Bodyweight	Blood Magnesium. Mg. per cent.			Result.
			Before Mn Administration.	After Mn administration.		
				Ear Vein. Per cent.	*Heart Blood.* Per cent.	
			Per cent.			
1,795 g.	5·000 g.	2·78 g.	3·70 mg.		2 hrs. = 6·89 mg.	Died in 2 hrs.
2,040 „	5·000 „	2·50 „	3·38 „		4 „ = 9·45 „	„ „ 4 „
1,620 „	4·000 „	2·50 „	3·70 „	10 min. = 5·92 mg.	2½ „ = 6·66 „	„ „ 2½ „
1,865 „	3·730 „	2·00 „	3·50 „		4½ „ = 7·57 „	„ „ 4½ „
2,397 „	3·600 „	1·50 „	3·55 „	6 hr. = 5·55 „	—	„ overnight
1,290 „	1·935 „	1·50 „	3·50 „	9½ „ = 4·70 „	9½ „ = 4·96 „	Killed
2,550 „	3·822 „	1·50 „	3·38 „	2½ „ = 5·00 „ 7¼ „ = 4·70 „	7¼ „ = 5·12 „	„
1,315 „	1·972 „	1·50 „	3·50 „	2½ „ = 4·89 „	2½ „ = 5·06 „	„
1,575 „	2·361 „	1·50 „	4·34 „	5 „ = 5·33 „	5 „ = 5·40 „	„
2,277 „	2·646 „	1·25 „	3·75 „	2¾ „ = 6·35 „	—	Died overnight
1,355 „	1·700 „	1·25 „	3·41 „	24 „ = 1·86 „	—	Killed
1,500 „	1·875 „	1·25 „	3·72 „	22 „ = 5·13 „	—	Lived
2,117 „	2·117 „	1·00 „	3·89 „	24 „ = 2·43 „	—	„
1,805 „	1·000 „	0·50 „	3·65 „	24 „ = 2·81 „	—	„

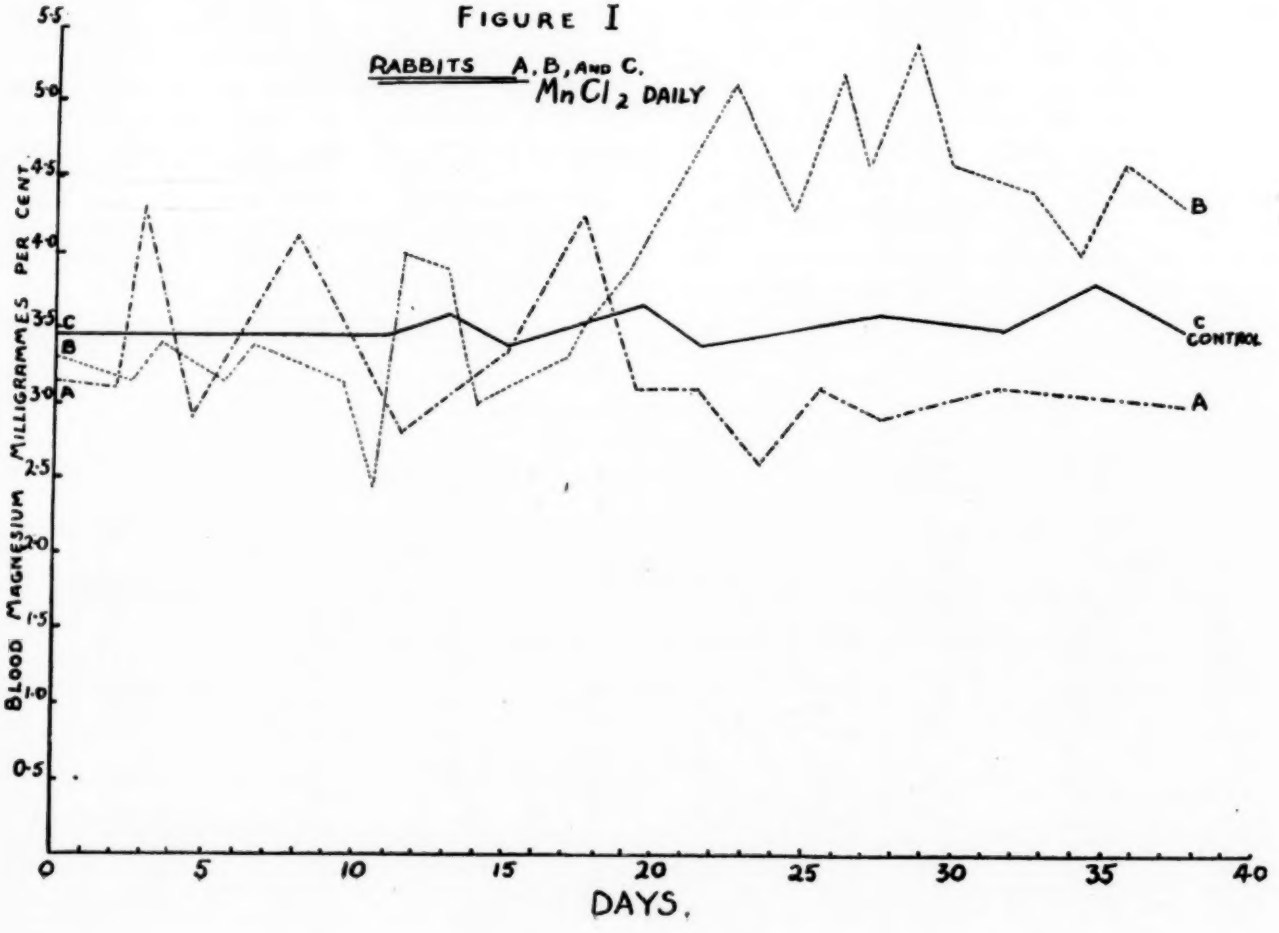
It appears, therefore, that the administration of manganese chloride by the mouth in some way alters the magnesium level of the blood and further work was directed to a study of the effect of sublethal doses of manganese chloride on the blood magnesium.

The first experiment was carried out with two rabbits, A and B. These received for 40 days doses of manganese chloride mixed in approximately 50 grm. of equal parts of crushed oats and bran together with as much cabbage as they cared to eat, provided that they had first cleared up the dry food. This they did readily and maintained their weight which was approximately 1·5 kg. Rabbit A received 0·13 grm. $MnCl_2$ and Rabbit B 0·065 grm. $MnCl_2$ per kg. body weight daily. Rabbit C was kept under identical conditions and received the same diet as the other two animals but without the addition of manganese chloride. Blood samples were taken from a marginal ear vein on alternate days and the magnesium content of the serum was determined by the standard method and expressed in milligrammes per cent. The results of this experiment are shown in Fig. 1.

It will be seen that whereas the blood magnesium level of the control animal remained very constant during the experiment, considerable variation occurred in the case of the animals receiving manganese chloride. There was, however, no indication that the blood magnesium level was following any particular course and the experiment was repeated in a modified form on pregnant and lactating rabbits.

Rabbit D, which had given birth to a litter of four three days previously, and which weighed 2·7 kg., was given 2·7 grm. $MnCl_2$ by means of a stomach tube. This animal had a blood magnesium level of 4·52 mg. Mg per 100 c.c. serum but three days after dosing it had fallen to 2·86 mg. Mg and another dose of 2·7 grm. $MnCl_2$ was given. Three days later, the magnesium level of the blood had risen to 3·17 mg. and the animal received a further dose of 2·7 grm. $MnCl_2$. Seven days after this dose, the blood magnesium level had risen to 4·84 mg. The animal died on the following day and on *post-mortem* examination, the lesions in the liver were suggestive of manganese poisoning as

FIGURE I



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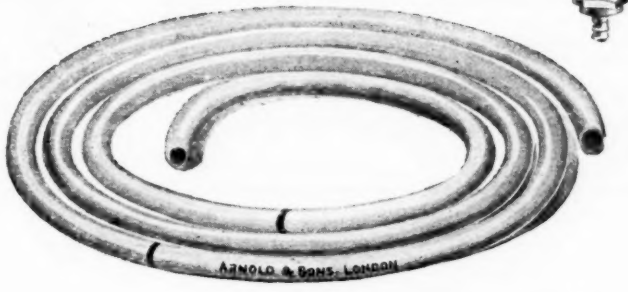

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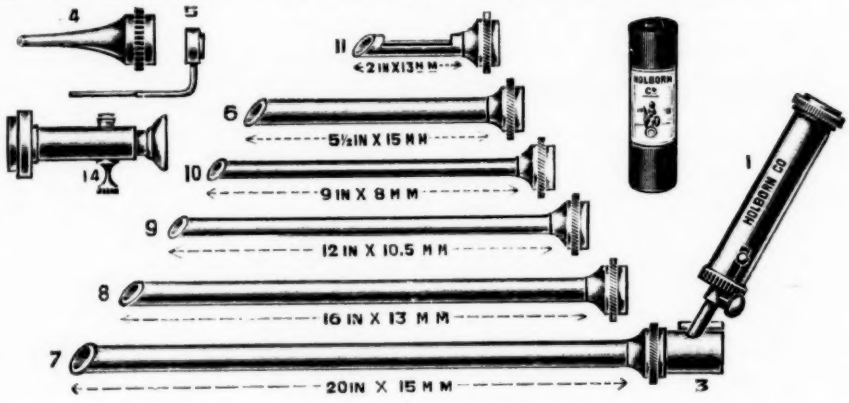

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described by Findlay (1924). The experiment was repeated, however, on Rabbit E but, in this case, manganese administration was begun ten days before parturition. The result was very similar to that obtained with Rabbit D and calls for little comment. The animal had received 6·7 grm. $MnCl_2$ in three doses over a period of 25 days at the rate of 1 grm. per kg. body weight.

Rabbit F, which gave birth to a litter of six on the first day of the experiment, received 0·5 grm. $MnCl_2$ in the food daily for 25 days. In this case, after a fall in the blood magnesium level from 3·5 mg. to 2·66 mg. in three days, there appeared to be a more or less steady rise until the experiment was ended. Rabbit G, which served as a control to these experiments, gave birth to a litter of eight, seven days after the experiments started. The magnesium content of the blood of this animal was estimated on alternate days with the exception of Sundays. There was little alteration in the blood magnesium level until the litter was born when a rise from 3·10 mg. to 3·70 mg. Mg took place over seven days. Three days later this was followed by a fall to 2·83 mg. Mg and a further rise. The results of these experiments are shown in Fig. 2.

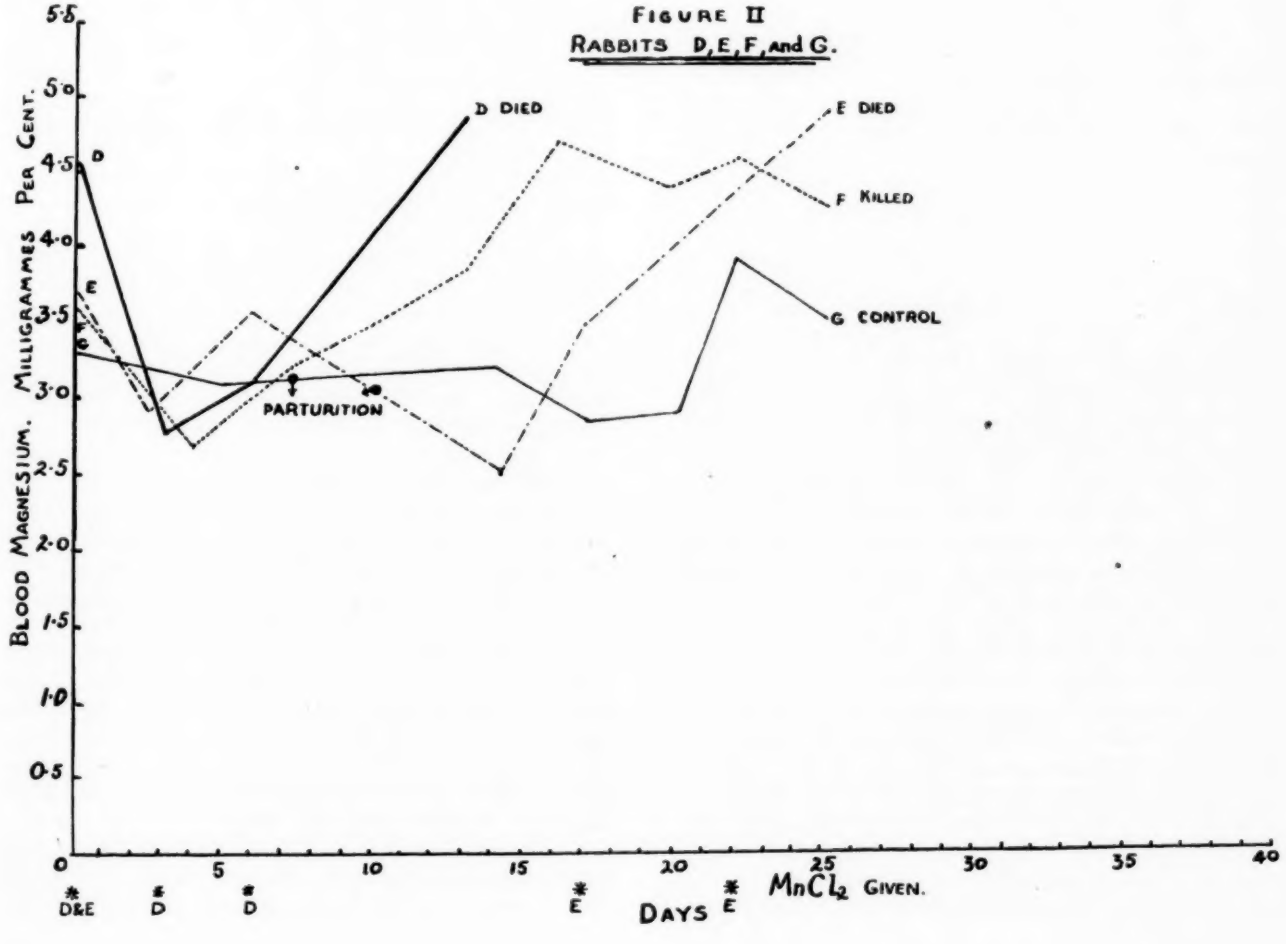
A final experiment was carried out with five rabbits, two male and three female but neither pregnant nor lactating. They received the same diet as in the earlier experiments. Rabbit H was the control. Rabbits I and J received 1 grm. $MnCl_2$ and Rabbits K and L 0·5 grm. $MnCl_2$ per kg. body weight at intervals during the experiment. Blood samples were collected from a marginal ear vein on alternate days and the magnesium content of the blood estimated as before.

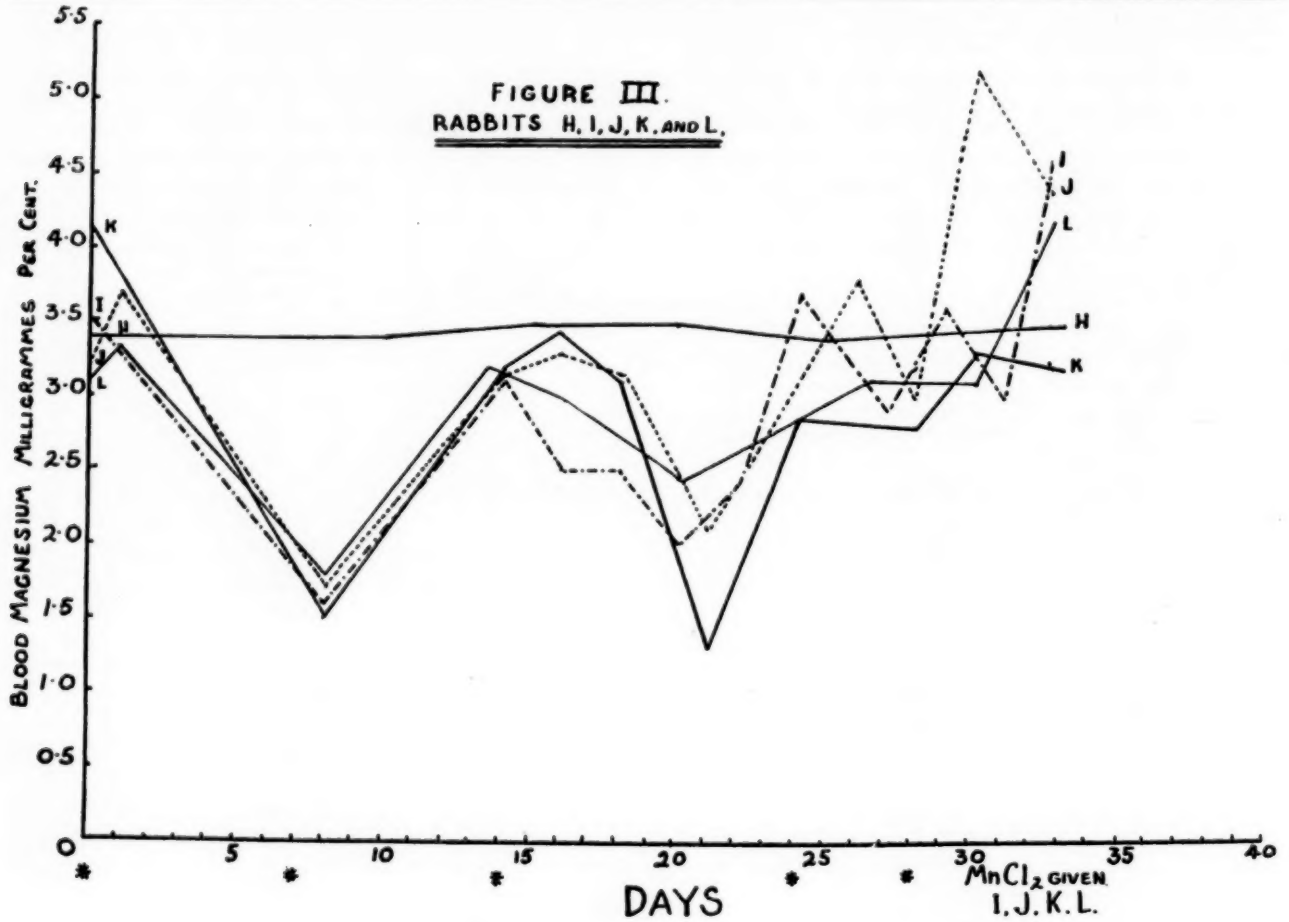
After the first dose of manganese chloride, there was in each case a fall in the magnesium level of the blood. This rose again after seven days in spite of another dose and thereafter it became very variable but was apparently unaffected by further doses of manganese chloride. The magnesium level of the blood returned to normal towards the twenty-fourth day of the experiment, which was concluded on the thirty-third day. The results are shown in Fig. 3 (*overleaf*).

Further experiments on the same lines were carried out with four sheep and one cow. In this case, the amount of manganese chloride given was approximately the same as that which the animals would have received had they been grazing on pastures with a high

FIGURE II

RABBITS D, E, F, and G.





manganese content. Three of the sheep were given 100 c.c. of 10 per cent. manganese chloride daily and the magnesium content of the serum determined. With the exception of Sheep 1, all the animals were lactating at the time of the experiment. Sheep No. 4 served as a control.

In this case also, as will be seen from Table IV, the administration of manganese chloride produced an immediate fall in the blood magnesium level of the three sheep. It returned to a more normal figure, however, towards the end of the experiment although the concentration of manganese chloride was increased to 33 per cent. and 50 per cent. respectively in the case of Sheep Nos. 1 and 2. The blood magnesium level of the control sheep remained very constant.

The cow used for experiment was a four-year-old Ayrshire which had previously had one calf and which calved on July 20th. Seven days later it was given 200 c.c. of 15 per cent. $MnCl_2$ daily. This was divided into two doses, 100 c.c. being given at 10 a.m. and 100 c.c. at 3 p.m. Blood samples were taken daily from the jugular vein and the blood magnesium estimated. As in the previous experiments, after a fall in the blood magnesium level, this returned to normal and the experiment was concluded. On the eleventh day of the experiment, the blood calcium was determined as well as the blood magnesium. As will be seen from Table IV, there was no compensatory rise in the blood calcium when the blood magnesium fell. In fact, the calcium tended to rise together with the magnesium.

Conclusions

It must be emphasised at once that in none of the experimental animals were signs of tetany ever produced nor, in fact, was any disturbance in the health of the animals seen at any time, except, of course, when definitely toxic amounts of manganese had been given. It became clear from the results of the blood analyses that only the first doses of manganese consistently depressed the blood magnesium level and this occurred solely when sub-lethal doses were given. Apart from the fact that it was possible to produce a low blood magnesium level only for seven or eight days, the findings agree closely the events which take place when cows are first turned into pastures with a high manganese content. In this case, the blood magnesium level is depressed for the first few weeks after which it returns to normal. In both cases, there is neither clinical nor *post-mortem* evidence of manganese poisoning nor, for that matter, is there any evidence of such in cases of lactation tetany. This, however, does not preclude the possibility that traces of manganese in excess of the normal requirements of the body

Table IV: Daily Administration of $MnCl_2$.

Days.	Sheep No. 1.	Sheep No. 2.	Sheep No. 3.	Sheep No. 4.	Cow.	
	Blood Magnesium.	Blood Magnesium.	Blood Magnesium.	Blood Magnesium.	Blood Magnesium.	Blood Calcium.
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Predosing 1 ...	—	—	—	—	3·55 mg.	—
„ 4 ...	—	—	—	—	3·60 „	—
„ 7 ...	3·12 mg.	2·74 mg.	2·93 mg.	2·81 mg.	3·23 „	—
Dosing 1 ...	3·03 „	2·53 „	2·64 „	2·59 „	2·64 „	—
„ 2 ...	3·92 „	1·80 „	2·29 „	2·59 „	2·33 „	—
„ 3 ...	2·52 „	1·28 „	2·46 „	2·66 „	2·32 „	—
„ 4 ...	2·32 „	1·29 „	2·26 „	2·59 „	2·07 „	10·92 mg.
„ 5 ...	2·08 „	1·56 „	2·11 „	2·47 „	1·97 „	10·66 „
„ 6 ...	2·17* „	2·04 „	2·03 „	2·77 „	1·69 „	10·66 „
„ 7 ...	2·27 „	2·24 „	2·13 „	2·66 „	1·79 „	10·53 „
„ 8 ...	2·12 „	2·06 „	2·15 „	2·66 „	1·67 „	10·80 „
„ 9 ...		2·27 „	2·15 „	2·63 „	1·79 „	10·80 „
„ 10 ...		2·38 „	2·36 „	2·73 „	1·79 „	10·53 „
„ 11 ...		—	2·24 „	—	1·65 „	10·80 „
„ 12 ...		2·38 „	1·90 „	2·56 „	1·82 „	11·06 „
„ 13 ...		2·32† „	1·60 „	2·66 „	1·89 „	10·93 „
„ 14 ...		2·62 „	2·40 „	2·81 „	2·44 „	10·93 „
„ 15 ...		2·08 „	2·38 „	2·77 „	2·61 „	11·33 „
„ 16 ...			2·24 „		—	—
„ 17 ...			2·89 „		2·89 „	11·16 „
					2·51 „	11·60 „
„ 18 ...			3·17 „		2·62 „	11·33 „
„ 19 ...			2·61 „		—	—
„ 20 ...			2·46 „		2·61 „	10·93 „
„ 21 ...			2·46 „		3·20 „	
„ 22 ...			—		2·90 „	
„ 23 ...			2·19 „		2·96 „	

* 33 per cent. $MnCl_2$. † 50 per cent. $MnCl_2$.

may produce some metabolic disturbance which is gradually corrected.

It is not proposed to discuss here the amount of manganese in particular soils nor its availability to the plant, for these are extremely complicated questions as yet not well understood. It is clear, however, that lactation tetany is common in Lincolnshire when the manganese content of the grass is likely to be at its maximum since the disease occurs only in the spring, particularly in seasons which favour the rapid growth of grass. Moreover, in this district, the cows are not housed at night, nor do they receive any supplement to their diet of grass at this time of the year. It may be mentioned that Adamson (1936) records a disease of cows closely resembling lactation tetany which he considers to be more prevalent in Lancashire in seasons which favour the rapid growth of grass and observers in other parts of the world have also found that the disease is more common when cows are first turned out to pasture; for example, Hopkirk (1935) records that in New Zealand the disease is more prevalent after the first flush of spring grass.

The evidence so far collected indicates that in Lincolnshire, at any rate, the connection between the abundance of young grass and the fall of the blood magnesium level is due to the presence of large amounts of manganese in the grass. It is not suggested, however, that manganese is the only substance which will produce this effect.

Although the presence of abnormally large quantities of manganese in the grass may account for the low blood magnesium level, it does not explain the aetiology of lactation tetany. It can be said that, up to the present, no case of the disease has been recorded in which a low blood magnesium level was not present but a number of cows in the same herd may show this and yet only some of them will suffer from an attack. Further, intraveneous injections of magnesium are not universally accepted as having any curative value, and it has already been pointed out that there is no lack of available magnesium in the diet. A magnesium deficiency, therefore, cannot be held responsible in this case for producing either a low blood magnesium level or lactation tetany. Thus the disease may be differentiated from the tetany of rats described by Kruse, Orent and McCollum (1932) and the tetany of calves fed exclusively on whole milk described by Duncan, Huffmann and Robinson (1935).

As Schmidt and Greenberg (1935) point out, tetany can result from extreme alterations of a number of bodily constituents and undoubtedly

lactation tetany results from the interaction of a number of factors. It may be that, under certain circumstances, there is sufficient disturbance of the blood calcium-magnesium ratio, as suggested by Seekles and Sjollema (1933), to interfere with the normal functioning of the neuro-muscular system which becomes so deranged that fright or some other external stimulus brings on an attack of tetany. However, the authors of the present paper have been unable to assure themselves that the disturbance of the calcium-magnesium ratio, which usually occurs in lactation tetany, is sufficiently large to upset the functioning of the neuro-muscular system, nor do they consider that the disease is primarily due to cortical disturbances as Green, Allcroft and Montgomerie (1935) suggest is the case in transit tetany of ponies.

It is realised that the bearing of the results recorded here on the aetiology of lactation tetany required further elaboration but it was thought desirable to publish the work so far done, as it is unlikely that the present authors will be able to maintain the close collaboration necessary for such work.

Summary

A study of outbreaks of lactation tetany in Lincolnshire led the authors to examine the pastures in affected districts. Botanical analyses revealed that these were composed of grasses of poor quality which were found to contain abnormally large quantities of manganese.

Experiments on rabbits showed that the oral administration of sub-lethal doses of manganese is followed immediately by a temporary reduction in the magnesium level of the blood. The same effect was produced in sheep and cattle when they received approximately the same dose of manganese as they would have done had they been grazing on pastures with a high manganese content. It was found, however, that repeated doses of manganese do not depress the blood magnesium level indefinitely.

It has not been shown that manganese is the specific cause of lactation tetany nor that the disease is due to manganese intoxication. However, since in Lincolnshire, lactation tetany occurs under conditions in which the manganese intake is likely to be at its maximum, a more detailed investigation into manganese metabolism might throw considerable light on the aetiology of the condition.

Acknowledgment.—The authors take this opportunity of expressing their great indebtedness to C. W. B. Wright for carrying out the botanical survey of the pastures and to Dr. R. Nicolaysen, of Oslo, and Dr. E. M. Crowther, of Rothamsted, for much helpful advice.

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A CEREMONY IN HONOUR OF PROFESSOR LECLAINCHE

The National Syndicate of Veterinary Surgeons held a special meeting in Paris, on March 18th, to render honour to Professor Leclainche, Honorary Director of the Veterinary Services of the Ministry of Agriculture, and Director of the Office International des Epizooties, on the occasion of his 75th birthday and of his election as President of the Academy of Science. Many eminent gentlemen were present and the following spoke: M. Clavet, President of the Syndicate; M. Bonchet, President of the Veterinary Academy; M. Nicholas, Inspector of Veterinary Schools; M. Martel, President of the Academy of Medicine; General Mounier, in the name of the Army Veterinary Service; M. Boussard. Chief of the Veterinary Services at the Ministry, who spoke for the Minister of Agriculture. All these expressed their appreciation of the important scientific and administrative work of the new President of the Academy of Science.

Professor Leclainche expressed his gratitude in an eloquent speech and M. Marius Montel, Minister of the Colonies, in a concluding speech expressed the desire of the Government to associate itself with the homage rendered to Professor Leclainche.

* * * * *

In reply to a deputation from the National Federation of Women's Institutes, introduced by Lady Denman, the Minister of Health stated that over 400 maternity and child welfare authorities supplied milk, liquid or dried, free of charge or at a reduced rate in necessitous cases to expectant and nursing mothers and young children under school age. The object of the deputation was to urge the Government to take action to reduce the retail price of milk.

The Veterinary Record

April 3rd, 1937.

International Veterinary Co-operation in Africa

THE report of the West African Veterinary Conference held in July, 1936, at Pong-Tamale, is of great interest from many points of view. Those reading the report will at once be struck by the exceedingly friendly relations existing between the veterinary officers of the respective territories and their neighbours representing the administration of another country. The frank and vigorous discussions which took place with regard to the many problems encountered, even when opinions were not unanimous, were ample evidence of the existing good relations. The sincere statement of difficulties met with, and the ready offers of co-operation, all demonstrate the efficiency of the Departments concerned.

Conditions vary enormously, even in adjacent territories, and the exchange of experience and opinions in such circumstances is always of the greatest value. It is impossible to emphasise sufficiently the importance of personal contact. One conference such as this has far more effect in the solution of difficulties than the writing of hundreds of letters.

Mr. Stewart, the Director of Veterinary Services, Gold Coast, is to be congratulated upon the excellent conference that was held in his territory.

There is ample evidence that the veterinary departments in West Africa are fully alive to their responsibilities and are striving in every way to improve the health of the livestock in their territories.

* * * * *

Veterinary Adviser to the Colonial Office

IN the course of the conference referred to above the urgency was emphasised of the necessity for co-ordination of certain veterinary activities, in different territories controlled by the Colonial Office; this co-ordination would appear to be essential if the results of work undertaken in the various territories are to be mutually useful. It is clear that such co-ordination could only be organised properly by a veterinary officer having the influence of a senior official position at the Colonial Office. The Directors of Veterinary Services in the various Colonies realise the absolute need for a Veterinary Adviser in that position and they deprecate strongly the loss in efficiency consequent upon the existing somewhat chaotic conditions.

This Association has repeatedly urged that a successor to the late R. E. Montgomery should be appointed. When the Colonial Office can employ, apparently usefully, a second senior agricultural officer, lately a Director of Agriculture, as assistant to its Agricultural Adviser, it is not possible to defend the absence of the Veterinary Adviser. In any case the defence of such omission has always been weak. In the first instance the financial depression was advanced as the excuse and latterly it has been contended that such an officer would be of no material advantage to Colonial Office administration. A step in the right direction has been taken in appointing Mr. John Smith to be Chairman of the Colonial Office's Committee on Animal Health, but this honorary committee can in no way take the place of a permanent veterinary adviser, no matter how frequently it meets. In the opinion of this Association the demand for such an appointment is likely to increase rather than diminish with the work of this committee.

It cannot be emphasised too clearly that there is no one on the staff of the Colonial Office competent to advise on veterinary matters and that this is an omission which will react more and more strongly against the efficient organisation of both the veterinary services and the general administration of the Colonial territories.

MANDELIC ACID

As stated in *The Lancet* of December 26th, the value of mandelic acid in the treatment of urinary infections is widely recognised in this country, and it is interesting to have the observations from the American side recorded in the same issue of that journal: "The *Journal of the American Medical Association* for November 28th contains four papers devoted to mandelic acid and ammonium mandelate, and while the results recorded are as satisfactory as those obtained in England, much the same difficulties and disadvantages have been encountered. The clinical value of the new antiseptic is confirmed by two series of cases reported by Carroll, Lewis,

and Kappel,* and by Cook and Buchtel.† The formers' cure-rate of 81 per cent. in cases of *B. coli* infection compares favourably with recent reports here and with the results obtained with the ketogenic diet. On the other hand the difficulty of sterilising urine infected with *Bacillus proteus* has often been noticed, and this difficulty is the more striking since in test-tube experiments Helmholz and Osterberg‡ found this organism the most sensitive of those examined. The clinical failure probably depends partly on the fermentative action of the bacillus and also partly on the type of case in which it is most commonly found.

"Helmholz and Osterberg have confirmed the original laboratory work that lay behind Rosenheim's introduction of the new drug for clinical use. They show that it is an active bactericidal agent in acid urine and that while at a *p*H of 5·0, 0·25 per cent. of mandelic acid was bactericidal for most organisms, at a *p*H of 5·7 four times that concentration (1 per cent.) was needed to produce the same effect. They also found that, using the routine treatment, a concentration of ½ to 1 per cent. of mandelic acid was readily obtained in the urine. Almost all the ingested mandelic acid appeared in the urine within 24 hours, the excretion being maximal about two hours after its administration. This emphasises, of course, the need for repeated dosage of the drug if a satisfactory bactericidal effect is to be maintained. Investigating the renal function in animals after the intravenous injection of sodium mandelate, they found a definite diminution in the urea-clearance ability of the kidneys, but concluded that any injury that might be produced was only temporary. Cook and Buchtel, who noted a similar effect in man, emphasise the need for caution in using the mandelic acid in patients with a reduced renal function and especially in the aged. Dolan§ strikes a note of warning when he says that not enough is known about the new drug to warrant the use of the unrestricted title of "urinary antiseptic." He used it regardless of the presence of pre-existing pathological conditions and reported various complications, and while his cases bear testimony to its great bactericidal power, even when there is urinary stasis, they emphasise what was said by almost every speaker at last month's meeting at the Royal Society of Medicine—namely, that the underlying lesion must always be taken into consideration.

"Among the complications Dolan records haematuria was prominent. This has not been widely observed in this country and its occurrence in a case of senile enlargement of the prostate and one of suspected renal tuberculosis may well have been due to the altered acidity of the urine, quite apart from the mandelic acid. Dolan suggests that the drug should not be widely distributed without attention being called to the possible complications; and all workers, both in England and in the United States, insist that the treatment must be adequately controlled, that it should not be used where renal function is impaired, and that wherever the infection does not respond a complete urological examination should be made."

*Carroll, G., Lewis, B., and Kappel, L. *Jour. Amer. Med. Assoc.* November 28th, 1936. p. 1796.

†Cook, E. N., and Buchtel, H. A. *Ibid.* p. 1799.

‡Helmholz, H. F., and Osterberg, A. E. *Ibid.* p. 1794.

§Dolan, L. P. *Ibid.* p. 1800.

CLINICAL COMMUNICATIONS

The Use of Pentothal Sodium as a Short-Duration Anaesthetic in Small Animals

MADELINE and D. H. SHEPPARD, MS.R.C.V.S.
Bayswater

The use of pentothal sodium as a general anaesthetic in canine surgery was first recorded in this country by Wright, J. G. (1937.) [*Vet Rec.* **49.** 2.]. The following series of thirty cases gives further evidence of the value of the drug for producing short-duration anaesthesia in small animals.

The drug was administered in all cases by the intravenous route and we have found that the use of the radial vein facilitates the injection and assessment of anaesthesia when only one assistant is available.

We would lay great stress upon the fact that muscular relaxation occurs at an early stage—when approximately one-third of the dose has been given—and it is essential that injection be continued until complete relaxation of the jaw occurs, at which point surgical anaesthesia is present.

The duration of anaesthesia is proportional to the rate of injection (Cases (*) Nos. 9, 14, 18, 22, 23) and it is of great importance that injection should not be completed in less than five minutes. The rate of recovery is also proportional to the rate of induction of anaesthesia and is usually complete in from two to three hours.

Conclusions

We have found pentothal sodium anaesthesia to be of particular value for the performance of minor surgery in general practice. In our opinion it entirely replaces the use of morphine and local anaesthesia, for the following reasons:—

(1) Surgical interference is facilitated by general anaesthesia.

(2) Induction is quiet and rapid (five minutes as against half-an-hour).

(3) Recovery is quiet, rapid and complete in from two to three hours.

(4) In four hours the animal may be safely discharged from the surgery without the risk of a later call to reassure apprehensive clients.

Nos.	Subject.	Condition.	Operation.	Wt.	Dose.	Remarks.
				lb.	gr.	
1	7 m.o. Cairn	good	examination upper respiratory tract	9	1·5	Light anaesthesia 15 mins. Recovery 60 mins.
2	9 m.o. Cairn	good	examination split palate	11	1·75	Injection 5 mins. Deep anaesthesia 11 mins. Cyanosis developed. Head raised 20 mins. Recovery 60 mins.
3	4 m.o. mongrel	good	set fracture	13½	1	Light anaesthesia 15 mins. Recovery 40 mins.
4	5 y.o. terrier	poor	deep submaxillary abscess	15	1·25	Deep anaesthesia 7 mins. Head raised 15 mins. Staggering 70 mins. Normal 2 hours.
5	10 y.o. Aberdeen	mitral disease	teeth extraction	15½	2	Deep anaesthesia 15 mins. Raising head 30 mins. Staggering 50 mins. Normal 70 mins.
6	8 y.o. pug	uraemic	urethrotomy	17	2	Deep anaesthesia 10 mins. Head raised 45 mins.
7	4 m.o. mongrel	good	set fracture	17	3½	Deep anaesthesia 10 mins. Head raised 15 mins. Normal 90 mins. Only case to show excitement during recovery.
8	6 y.o. mongrel	fair	teeth extraction	17	3½	Anaesthesia 15 mins. Head raised 35 mins. Normal 2 hours.
9*	7 y.o. terrier	good	teeth extraction	19	2½	Injection 2½ mins. Deep anaesthesia 8 mins. Normal 50 mins.
10	3½ m.o. mongrel	good	set fracture	20	2½	Deep anaesthesia 10 mins. Head raised 35 mins. Normal 2 hours.
11	5 y.o. Aberdeen	good	teeth extraction	21	3	Light anaesthesia 10 mins. Head raised 20 mins. Normal 2 hours.
12	5 y.o. terrier	good	teeth extraction	21	3½	Deep anaesthesia 8 mins. Head raised 16 mins. Normal 2 hours.
13	12 y.o. terrier	mitral disease	teeth extraction	22	3·25	Deep anaesthesia 10 mins. Head raised 20 mins. Normal 90 mins.
14*	11 y.o. Sealyham	mitral disease	teeth extraction	22½	3	Injection 3 mins. Light anaesthesia. 10 mins. Head raised 15 mins. Normal 50 mins.
15	5 y.o. terrier	good	teeth extraction	24	4	Deep anaesthesia 15 mins. Head raised 40 mins. Normal 2 hours.
16	10 y.o. mongrel	mitral disease	teeth extraction	24½	2·25	Light anaesthesia 5 mins. Head raised 20 mins. Normal one hour.
17	5 y.o. Sealyham	good	dress extensive scalds	26	4	Deep anaesthesia 12 mins. Head raised 20 mins. Normal 90 mins.
18*	2½ y.o. Aberdeen	good	Caesarian section	27	5	Injection 10 mins. Deep anaesthesia 35 mins. Head raised 45 mins. Normal 4 hours.
19	8 m.o. mongrel	good	reduction luxated elbow	29	3½	Deep anaesthesia 10 mins. Head raised 20 mins. Normal 90 mins.
20	Same subject 5 days later		reduction luxated hip	29	4	Deep anaesthesia 15 mins. Head raised 30 mins. Normal 2½ hours.
21	4 y.o. spaniel	good	teeth extraction	40	6·75	Deep anaesthesia 7 mins. Head raised 18 mins. Normal one hour.
22*	8 y.o. mongrel	uraemic	urethrotomy	42	7	Injection 10 mins. Deep anaesthesia 20 mins. Head raised 60 mins. Normal 3 hours.
23*	8 y.o. spaniel	good	teeth extraction	42	3	Injection 90 secs. Deep anaesthesia 8 mins. Normal 45 mins.
24	8 y.o. mongrel	fair	teeth extraction	42	6	Deep anaesthesia 10 mins. Head raised 18 mins. Normal 90 mins.
25	10 y.o. Airedale	chronic nephritis	teeth extraction	42½	5·25	Deep anaesthesia 15 mins. Head raised 30 mins. Normal 90 mins.
26	6 m.o. spaniel	distemper	fits	21	2	deep anaesthesia 15 mins. Head raised 30 mins. No further fits for 24 hours—when dose repeated.
27	3 y.o. cat	good	castration	15	2½	Deep anaesthesia 15 mins. Head raised 30 mins. Normal 60 mins.
28	2 y.o. cat	good	haematoma	13	1·75	Deep anaesthesia 8 mins. Normal 2 hours.
29	5 y.o. cat	good	haemotoma	10	1·25	Deep anaesthesia 7 mins. Head raised 10 mins. Normal 35 mins.
30	6 y.o. cat	good	abscess	21	1½	Light anaesthesia 15 mins. Normal 45 mins.

Except where otherwise stated, injection was completed in 5 minutes.

Intussusception in a Cat

G. A. TOMLIN, M.R.C.V.S.
London

In this case the subject was a male cat, aged seven years.

The animal was seen at the surgery, when it was reported to be straining.

On examination, a piece of rag several inches in length was removed from the rectum without difficulty. On the following morning the cat was brought back, having died during the night.

Post-mortem revealed intussusception, accompanied by inflammation.

* * * * *

Teratomatous (?) Growth in a Cat

G. A. TOMLIN, M.R.C.V.S.
London

The subject was a male cat, aged four years. There was no history other than the owner's statement that the cat was unable to sit down.

Examination revealed a horny tube projecting to the extent of an inch-and-a-half from the body on the left hand side of and below the anus. It resembled a quill and definitely was not a foreign body. This was cut off level with the skin and the animal made an uneventful recovery.

THE INSPECTOR AND THE BULL

Commenting on the trials of Government officials in the Dorset countryside, one of His Majesty's Inspectors of Schools, speaking at a Poole dinner, vouched for the accuracy of the following incident.

An Inspector of the Ministry of Agriculture arrived at a Dorset farm to find himself faced at the gate by a young farm labourer with a stolid face; one of those stolid faces behind which lurks so much intelligence.

On the inspector's request to see the farmer, the lad replied: "Casn't."

"Why can't I?" asked the inspector, and the lad answered slowly, "'E baint 'ere."

"I want to see your herd of cows," said the inspector, and the lad again replied "Casn't."

"But I must," declared the inspector, with more than a touch of official irritation, and he produced his credentials. These were read slowly and carefully (the sentence method) by the lad, who then said, "'Alf be out there, and t'other 'alf be in there" (indicating the field and the cowhouse).

While the inspector went "out there" the lad hopped "in there" and let the bull "out there."

The inspector was leaving "out there" when he found himself some distance from the fence and the bull taking quite an interest in him. Soon he was making good speed for the gate, and as he shouted "Help! Help!" the lad poked his face over the far side of the fence and remarked calmly, "Show 'im thee card."

West African Veterinary Conference

DEPARTMENTAL CO-OPERATION IN DISEASE CONTROL

Following is a report of the proceedings of the Veterinary Conference held at Pong-Tamale on July 17th and 18th, 1936, between representatives of the veterinary services of the Gold Coast, Nigeria, Ivory Coast and Togoland and Dahomey.

The participating veterinary officers were: Captain W. W. Henderson, Chief Veterinary Officer, Nigeria (Chairman); Mr. J. L. Stewart, Director of Veterinary Services, Gold Coast; M. Aillerie, Chief Veterinary Officer, Ivory Coast; M. Gargadennec, Chief Veterinary Officer, Togoland and Dahomey; Mr. A. Fulton, Veterinary Officer, Gold Coast, and Mr. W. C. L. Orr, Veterinary Officer, Gold Coast.

Mr. W. J. A. Jones, Chief Commissioner of the Northern Territories, Gold Coast, opened the Conference. Having welcomed the visitors and thanked them for attending the Conference, Mr. Jones said that he was sure the outcome of such conferences was of great value. He expressed his great appreciation of the work of the Department of Animal Health in the Gold Coast and explained how helpful the Director of Veterinary Services had been in writing a memorandum on the use of virus makers, serum bullocks, serum testers, etc. By means of this memorandum both he and his officers were made *au fait* with the work being carried on at the laboratory, and their interest naturally increased.

He was pleased to say that the co-operation between the Political Administration and Veterinary Department was excellent. The Director of Veterinary Services thoroughly understood the policy of the Government in the Northern Territories and veterinary officers supported the policy.

He appreciated the anti-tsetse fly campaign, which was being carried on at Pong-Tamale. The work had been conducted over a period of years and the results of experiments would be of value in tsetse eradication work in the future. There were many conflicting views on tsetse fly eradication work and the work at Pong-Tamale had done much to prove or disprove many theories.

Mr. Jones proceeded to point out the scope for development in Animal Husbandry. There was a very limited market for the sale of agricultural products, but there was room for great development and trade in livestock. Imports of livestock were decreasing and he hoped in the near future to see the Northern Territories, which could hold five times as many cattle, fill the gap. He spoke of the Native

Administration farms and the benefit that eventually would accrue from them, mentioning the better methods now used for forming the herds, *i.e.*, cows selected by veterinary officers would be paid for and the best cows would then be obtained. He hoped for assistance from the French authorities in the purchase of N'Dama bulls. He hoped that Government would give a larger grant for the improvement of the livestock industry in the Northern Territories. Money was required for the purchase of improved animals, housing, re-stocking areas, etc.

Objects of the Conference

(1) Interchange of knowledge between the various Colonies represented as regards disease control, experiments, livestock improvement and any other matters within the province of veterinary organisations. (2) To obtain co-operation and unified action for the control and eradication of the diseases of animals.

Captain Henderson suggested that resolutions be made on each subject.

M. Gargadennec asked for an exchange of Diseases of Animals returns between Nigeria and Dahomey and for early notification of outbreaks of disease near the frontier. Exchange of returns is already in existence between the other colonies.

RINDERPEST

(*a*) Captain Henderson said that, in his opinion, sero-virus (double) inoculation was the only proved method of obtaining permanent immunity. Four hundred thousand animals were immunised yearly in Nigeria by this method. In tsetse fly areas a high mortality sometimes occurred owing to trypanosomiasis. In these areas vaccine was given before double inoculation in the hope of reducing casualties. Even then the mortality occasionally reached 20 per cent. He was doubtful if a permanent immunity was established when vaccine was used as an adjunct. In the areas where intercurrent diseases cause very heavy mortality when sero-immunisation is used, he advocated the use of vaccine alone, and that a yearly re-vaccination be carried out. In such areas in Nigeria, outbreaks of piroplasmosis during immunisation were a problem. Occasionally high mortality occurred. He found there were two sources of infection: (1) From virulent blood used during inoculation. This could be controlled by the exposure of the virulent blood to a 1 per cent. solution of trypan blue for half an hour before use. This was now a routine measure. (Mr. Stewart mentioned that this procedure had been copied in the Gold Coast with good results). (2) He found at camps that had been in existence for some time, five to six years, that a heavy tick infestation occurred and infection from these ticks was responsible for casualties occurring after the cattle had left the camps. The remedy was to shift the camps at regular intervals.

Mr. Stewart mentioned that similar experiences and mortality in two herds in the Coastal Veterinary Section after leaving camps in the Gold Coast were due to anaplasmosis contracted through ticks in the camp. In the Gold Coast the methods of immunisation were very similar to those obtaining in Nigeria. Most reliance was placed on the sero-virus immunisation. Preliminary vaccination in the Gold Coast did not prevent a permanent immunity when followed by sero-virus inoculation, if a sufficiently small preliminary dose of vaccine was given. The thermal reaction after the subsequent sero-virus inoculation was not then cut out. He considered that where a thermal reaction occurred, a permanent immunity was established. This method had been tested and animals treated three years previously had been found to be immune.

M. Aillerie said that owing to lack of personnel, wholesale immunisation was not attempted in the Ivory Coast. Outbreaks of rinderpest were dealt with as they arose. Measures taken were solely to eliminate and control the outbreak. These measures comprised policing the affected area and the use of vaccine and serum.

M. Gargadennec stated that in Dahomey the same measures against rinderpest were taken as in the Ivory Coast. He also said that the territory had been free from rinderpest for three years.

Rinderpest Vaccine. — Captain Henderson informed the meeting that he was not satisfied with formalinised vaccine. Under field conditions he found that it rapidly deteriorated and after a month it was unreliable. At the moment glycerinated vaccine (Bennet's) was being tried out. Sufficient time had not yet elapsed for a conclusive report to be made, but the indications were that this vaccine would prove more satisfactory than the formalinised one. The dose was one gramme of spleen tissue per 100 kilogramme body weight. Experiments showed that immunity was established in a week. Large-scale vaccination started three months ago. He found that under cool conditions, such as could be obtained in the field, the vaccine was potent up to three months when kept in the dark. The two advantages of glycerin vaccine were (1) its keeping qualities under field conditions and (2) the immunity was established more quickly than with formalinised vaccine.

Mr. Stewart stated that he had found formalinised vaccine satisfactory. His experience, contrary to that of Captain Henderson, was that immunity was established in four or five days. The experience of all members of the conference was that when vaccine and serum were inoculated simultaneously immunity was not established amongst many animals.

Many were found to be susceptible one month after inoculation. Captain Henderson was of opinion that the serum nullified the action of the vaccine. It was agreed that this was an unsuitable method of control.

Saponine Vaccine (*Curasson*).—The method of preparation was submitted by M. Aillerie who stated that he had some experiments in progress. M. Gargadennec had carried out experiments with this vaccine. Immunity was tested 15 days and one month after vaccination by giving 10 c.c. virulent blood and there were thermal reactions.

Curative Treatment.—M. Aillerie mentioned a curative treatment—intravenous injection of 1 litre of four parts of formalin in 1,000 parts of physiological saline solution after bleeding 1 litre. He had had some good results.

Marking of Animals.—A discussion took place on the marking of animals immunised by the various methods. Confusion had already arisen through one colony using an ear mark for vaccine immunisation of trade cattle while a similar mark was used in another colony for sero-virus immunisation. It was agreed that some arrangement should be made whereby an agreed marking system should be used in adjacent colonies.

Quarantine.—Control of disease spread by trade cattle coming from one colony into another, was discussed. This movement is mostly one from French colonies into British. In the Gold Coast, quarantine stations have been established for many years and introduction of disease by trade cattle is well under control. Recently, ports of entry have been instituted in Nigeria.

Co-operation is being attempted between French and British authorities in supervision of trade cattle. At the recent Veterinary Conference at Dakar of veterinary officers of French West Africa, it was decided that all trade cattle entering British colonies would be vaccinated. Veterinary posts have been established at convenient places for this procedure, at Tenkodougou, Bobo Doulaoso for the Gold Coast importations. A discussion took place between Captain Henderson and the French veterinary officers *re* smuggling of cattle and measures to prevent it. A definite understanding was not arrived at. Mr. Stewart drew the attention of M. Gargadennec to the cessation of a trade in cattle from Nigeria across Dahomey and Togoland to the Gold Coast. Six years ago, 6,000 animals were imported by this route. The cause of the stoppage was the heavy tax imposed on trade cattle in Togoland. M. Gargadennec promised to inquire into this with a view to having the tax reduced.

Resolutions.—This Conference is of the opinion that rinderpest can be completely suppressed in Africa and that owing to the enormous economic losses caused annually by the ravages of this disease, steps should be taken forthwith to attain this end. But this can be accomplished only if effective measures on a large enough scale are carried out simultaneously in all the countries concerned. Each country working independently has only reduced the incidence of the disease in that country and has done nothing to solve the problem of the complete suppression of the disease in Africa (the disease has already been suppressed in the whole area to the south of the Zambesi).

This Conference suggests that, for the successful operation of any scheme of co-ordinated action, it will require the formation of a committee constituted of responsible representatives—political and veterinary—of all the colonies concerned, whose duty it will be to frame a policy of action suitable for each country and to ensure its effective execution. The British members of this Conference consider that the Veterinary Adviser to the Secretary of State for the Colonies, when this appointment is filled, would be a fitting representative of the British Territories in Africa on this committee.

Contagious Bovine Pleuro-pneumonia

M. Gargadennec stated that Dahomey had been free from this disease since 1917. In that year there was an epizootic of rinderpest which he thought was instrumental in killing all animals infected with pleuro-pneumonia.

M. Aillerie informed the Conference that there was very little pleuro-pneumonia in the Ivory Coast, and that it was four years since it was last noted. Captain Henderson observed that it was introduced into Nigeria in trade cattle from the Chad and Niger Colonies.

M. Aillerie submitted the Italian method of preparing vaccine in the field by Dr. Pirain and Dr. Lunardoni. He stated that good results had been obtained with the Italian method but not with Curasson's method, with which many accidents occurred. A successful experiment had been carried out with 96 animals and ten controls. The length of immunity obtained by the Italian method had been tested at Bamoko and it was found to be two months: he considered that this vaccine was useful in controlling and stopping an outbreak as deaths ceased after ten days.

The dose of the Italian vaccine was $\frac{1}{4}$ to $\frac{1}{2}$ c.c. whereas that of the Curasson vaccine was 60 to 120 c.c.

Captain Henderson mentioned that Bennet's vaccine was being used in Nigeria—the 134th generation, or thereabouts, was being used and then inoculated into the tail.

Mr. Stewart said that since the elimination of rinderpest, outbreaks of pleuro-pneumonia had been more frequent. Previously such outbreaks never got a chance to develop owing to the ever-present rinderpest.

Fortunately, there appeared to be no complications in the use of Bennet's vaccine, which could be used without any adverse result, inoculated into the skin behind the shoulder, and even such a young generation as the 29th could be used with perfect safety. All outbreaks were introduced from across the French frontier by trade or smuggled cattle, usually the latter. Pleuro-pneumonia was not enzootic in the Gold Coast.

Mr. Stewart mentioned his very successful curative treatment by using novarsenobillon, which had acted like a charm in every case treated so far, about a dozen in all. M. Aillerie also had had successful results with this method of treatment.

Captain Henderson commented on the difference in results in vaccination in Nigeria and the Gold Coast in spite of the fact that the vaccine was made by exactly the same method and technique in each country. Whereas in the Gold Coast, the 29th generation culture had been used with safety and inoculated into the subcutaneous tissue behind the shoulder, it was impossible to do this in Nigeria save with much older cultures, otherwise large and often fatal swellings occurred at the point of inoculation. The great defect of having to use very old cultures in pleuro-pneumonia vaccination was that the immunity took long to develop and old cultures were apt not to confer any immunity at all. Though cultures had been exchanged between Nigeria, the Sudan and the Gold Coast, no satisfactory explanation of this peculiar phenomenon had been given.

M. Aillerie mentioned treatment by an intravenous injection of colloidal silver—dose 5 c.c.—and also with a solution of biniodide mercury, 15 centigrammes; carbolic acid, 20 grammes; water, 100. Three injections are given at two-day intervals in doses of 5 c.c. It was recommended that active measures should be adopted to ensure control of the disease and that more experiments should be carried out with the different vaccines—Bennet's, the Italian, etc.

Trypanosomiasis

(*a*) Mr. Orr submitted a paper on the method of clearing for the eradication of tsetse flies in the Northern Territories of the Gold Coast. He observed that two kinds of clearings were being carried out in the Northern Territories, Gold Coast—(1) aggressive clearings, where the object aimed at was the total elimination of tsetse flies from a large area and (2) defensive clearings, which were made at river crossings on roads and trade routes, watering places, etc., the object aimed at being the reduction of the man and animal fly contact. In (1) the breeding grounds of the fly were wiped out, primary and secondary foci being cleared. It was stated that the Animal Health Department was the only organisation carrying out this work, which was of as much benefit to man as to animals.

The French delegates stated that up to date no clearings or experiments had been carried out in Dahomey or the Ivory Coast but that tsetse surveys had been made.

Mr. Orr said that, in defensive clearings at river crossings, anything less than 300 yards on each side of the crossing was of little use, and that reclearing should be carried out twice yearly. It was mentioned that in aggressive clearings it was not necessary to clear all trees—trees with long clean poles of ten to twelve feet could be left, provided that they were not too thickly grouped together. It was stated that, with trained gangs, clearings on the average Northern Territory rivers could be carried out for £2 3s. per acre (8d. per labourer per day) or £2 14s. a mile on rivers and streams with an average fringing bush depth of ten yards. Experiments had been conducted with Harris, Single Screen Swynnerton, McPherson (Medical Officer, Gold Coast), and rat varnish traps and it was considered that traps were of no use for the elimination of flies of the *palpalis* group, but that they were of use to determine the presence of flies.

It was recommended by the Conference that a large-scale campaign should be carried out to eradicate the fly after a thorough preliminary survey had been made and it was considered that in *palpalis* country it would be possible to wipe out or greatly reduce trypanosomiasis in man and animals. It was said that the clinical incidence of the disease was not high except when breakdowns to immunisation occurred. It was also stated that the incidence increased when animals were moved from one area to another—the animals although resistant to their own local trypanosome were not resistant to a strain in another area. Cattle which remained in their own areas rarely showed clinical symptoms. The statement was made that over 50 per cent. of horses passing Pong-Tamale to the south were infected. The commonest trypanosome was *T. vivax*. In Kumasi, recently, a 92 per cent. *T. vivax* infection was discovered amongst cattle.

A discussion took place between the delegates *re* the resistance of various breeds. It was questioned if environment rather than breed played a considerable part in the question of resistance. It was also mentioned that the density of fly infection might be a factor. It was the opinion of both the officers of the Gold Coast and the Ivory Coast that N'Dama cattle are more resistant than other breeds, this opinion being formed from experience with this breed.

The Chief Veterinary Officer, Nigeria, asked that he might be informed further of N'Dama experience in the Gold Coast. As regards treatment, M. Aillerie stated that he had used tartar emetic in doses of 1 gramme for horses and,

after a three-day interval, had injected atoxyl. At present he was not using tartar emetic, but his treatment consisted of three doses of atoxyl.

M. Gargadennec informed the Conference that his treatment was the administration of 1 gramme tartar emetic in 50 c.c. water every three days. He gave six injections. He considered this treatment good in horses for *T. cazalboui* [*vivax*] but not effective for *T. pecaudi* [*brucei*] and *T. dimorphon* [*congolense*]. In cattle he considered tartar emetic effective for all trypanosomes.

Captain Henderson remarked that very severe reactions had been observed after tartar emetic and the dose had to be greatly reduced. Formerly these severe reactions were not observed. It was stated that surfen "C" was good in finishing off treatment and that in dogs one dose sterilises.

Resolution.—The work at Pong-Tamale seems to show that the eradication of tsetse fly might be a practical proposition in orchard bush country and these operations are worth extending as it has been proved that the results obtained are of considerable value.

Rabies

The delegates from the Ivory Coast and Dahomey stated that outbreaks of rabies were controlled by police methods and human cases treated at Bamoko and Dakar.

Captain Henderson said that outbreaks were controlled by slaughter of infected and in-contact dogs and European-owned dogs were vaccinated. It was considered that immunity lasts six months.

Mr. Fulton stated that the same operations were carried out in the Gold Coast and at some places vaccination was compulsory.

Other Diseases

(*a*) (1) Piroplasmosis.—This disease is endemic and it is only considered a problem when double inoculation for rinderpest is being carried out.

(*a*) (2) Anaplasmosis.—Mr. Stewart remarked that this disease comes in waves and that bad outbreaks appeared in the Gold Coast.

M. Aillerie observed that gonacrine was a valuable agent in treatment, given intravenously in doses of 1 centigramme per kilo. Two doses were given at a week's interval.

It was stated that there was no success with this treatment in the Gold Coast.

(*a*) (3) Theileriasis.—M. Aillerie said that there had been an outbreak amongst calves in the Ivory Coast and he definitely said that it was East Coast fever. This was confirmed by Alfort. Some animals died. Treatment was carried out by gonacrine.

Mr. Stewart stated that a pathogenic form of theileriasis occurred in the Gold Coast, but it was a milder disease than anaplasmosis.

(*a*) (4) Heartwater.—M. Aillerie reported that this disease existed in the Ivory Coast, that Macina sheep were mostly affected and that importation had now been stopped. Mr. Stewart stated that the disease occurred in British Alpine goats and crosses; it also appeared in sheep from the Upper Niger.

Captain Henderson said that Southdown sheep imported from England and also their crosses died of the disease. It also occurred in cows, in which nervous symptoms predominated and the animal took on a wild expression. M. Gargadennec observed that the disease did not exist in Dahomey or Togoland.

(*b*) Blue Tongue.—M. Aillerie said that two cases occurred in sheep imported from the Sudan.

Mr. Stewart stated that it had occurred every year recently at Pong-Tamale in cross Niger sheep, but it had not been diagnosed in pure native sheep and attempts to transmit the disease to local sheep failed. The disease had not been diagnosed in Nigeria, Togoland or Dahomey.

(*c*) Anthrax.—M. Aillerie informed the Conference that many cases of this disease had occurred in the Ivory Coast during the last three years. Previous to that it had not been diagnosed. He suspected that it had been imported from Guinea. In an outbreak the in-contacts were treated with the second vaccine of Pasteur—intradermal; sheep, goats and cattle were inoculated and there were no deaths after treatment had been carried out.

Mr. Stewart stated that it appeared sporadically in the Gold Coast and there the measures taken were burying of the carcase or carcases and police measures.

M. Gargadennec observed that he had never seen a case of anthrax in Dahomey and no cases had been recorded. Captain Henderson mentioned that anthrax appeared in Nigeria in swamp areas and a vaccine which established an immunity in twelve days was made. This vaccine was a spore vaccine and to remove the risk of mortality, saponin was added to the anthrax culture.

(*d*) Contagious Abortion.—Mr. Stewart said that the disease existed, was endemic and of little economic importance at present. Periodical tests were carried out amongst the farm animals at Pong-Tamale and positives were kept together.

M. Aillerie stated that the disease occurred in the Ivory Coast, but he did not consider it serious. The disease was of no importance in Nigeria.

Captain Henderson mentioned that a dead vaccine had been used on Agriculture Department cattle.

M. Gargadennec said that he had not come across the disease in Dahomey or Togoland.

(*e*) Haemorrhagic Septicaemia.—M. Gargadennec mentioned that this disease was controlled by police measures.

Captain Henderson said that the disease occurred in Nigeria and a formalinised vaccine was used, which gave an immunity of two months only. The disease had never been diagnosed in the Gold Coast.

(*f*) Black-Quarter.—Mr. Stewart mentioned that this disease had not been diagnosed up to the present in the Gold Coast: if it did exist it was of little or no importance, for it would undoubtedly be reported by the native (who was extraordinarily good at reporting diseases) as it resembled anthrax clinically. The French delegates stated that it was undiagnosed in their respective Colonies.

Captain Henderson observed that it was a common and serious disease in Nigeria and it was attacked by carrying out large scale vaccination.

(*g*) Epizootic Lymphangitis.—This disease occurs in all the Colonies.

Captain Henderson cited a case of a horse having both trypanosomiasis and epizootic lymphangitis; when treated with tartar emetic the lymphangitis cleared up.

Poultry Diseases

(1) *Fowl Cholera.*—Mr. Stewart stated that this disease appeared in August during the rains and at the time when sand flies were troublesome. He thought the disease was borne by sand flies, and experiments to prove sand fly connection had been carried out. When fowl houses were sand fly proofed, the disease immediately stopped. An effective serum had been produced at the laboratory.

M. Aillerie said that the disease occurred in the Ivory Coast and M. Gargadennec that it had been imported into Dahomey.

Captain Henderson stated that he did not know of its existence in Nigeria.

(2) *Spirochaetosis.*—Mr. Stewart remarked that in the Northern Territories of the Gold Coast, this disease was ubiquitous. It could be cured by injecting novarsenobillon in doses of 0·046 gramme. Atoxyl, spirocid and novarsenobillon had all been tried and it was found that atoxyl was unsafe in doses of 0·025 and 0·05 gramme. It was proposed to make a vaccine. M. Gargadennec in Dahomey had satisfactory results with atoxyl and this was also the case in the Ivory Coast.

(3) *Bacillary White Diarrhoea.*—In Nigeria, Gold Coast and Dahomey, this disease had not been observed.

M. Aillerie stated that it was frequently seen in the Ivory Coast and treatment consisted of the administration of red wine and sugar.

(4) *Fowl-Pox.*—It was stated that this was prevalent in all the Colonies and that vaccination was carried out.

(5) *Fowl Typhoid.*—Serious epidemics of this disease occurred in both Nigeria and the Gold Coast, but it had not been recorded in the Ivory Coast or Dahomey.

M. Aillerie mentioned a treatment for fowl paralysis which consisted of urotropine 1 gramme intravenously plus 1 c.c. of saturated salt solution, given intravenously.

Animal Husbandry

M. Aillerie stated that two experimental farms were being run in the Ivory Coast at Konbogo and Bouake. At the former place selection in the N'Dama breed was being carried out and Charollais-zebu bulls were being crossed with N'Dama cows. The object of this cross was to improve the milking qualities.

M. Aillerie here emphasised the resistance of N'Dama cattle to trypanosomiasis.

At Bouake (1) selection was being carried out with Baoulee cattle for improvement of meat; (2) Bambara bulls and Baoulee cows were crossed for draught purposes; (3) imported N'Dama were being crossed with N'Dama-Baoulee for milk.

Mr. Stewart said that the livestock improvement work in the Gold Coast was being concentrated on the production of beef cattle for the markets. The shortage of beef and fresh meat in the Gold Coast markets amounted to a virtual famine.

The department had had experience of this work since pre-War days and at present actual field improvement work was being carried out by means of N'Dama and cross N'Dama bulls and the cows of the country and with zebu bulls, the most successful types of these being the Shorthorned Sudanese zebu and the White Fulani. The White Fulani also improved the milking qualities as did the N'Dama. The organisation consisted of a central Government farm producing improved bulls for Native Administration farms, which turned out improved bulls for the village herds. Cattle in the Gold Coast existed in communal units, *i.e.*, village and section herds, and though they belonged in twos, threes, and such numbers to individuals, their management was communal. Yorkshire pigs had improved the local animals, were successful for improvement work and were in great demand. Rhode Island Red and Leghorn poultry were the breeds used in the development of poultry and their crosses were excellent; many birds were available at the main Government farm at Pong-Tamale.

Sheep improvement work was still in the experimental stage and all work carried out with any kind of improved sheep, even African, had so far yielded disappointing results. This was a bad country for sheep in every way and the necessity for keeping sheep shut up at night on account of wild carnivores was a great inhibitory factor.

Goat improvement work had also given poor results owing to the susceptibility of all improved animals to heart-water (rickettsiasis).

M. Gargadennec stated that, in Dahomey, Lagoon cattle were being crossed with zebu to improve the milk. The experiments had only been going on for two years. Two Charollais bulls had been imported four years ago, but both had died and, from the history, piroplasmosis might possibly have been the trouble. As an experiment, Lagoon cattle had been moved to tsetse country and after 18 months they were still healthy. It was hoped in the near future to import Brittany cattle for milk improvement.

M. Aillerie observed that Alpine goats had been imported from France and crossed with Sudan goats and that these crosses were then crossed with the small goats in the south. The object of this was for milk supply. The crosses were distributed to large towns. He stated that there was no export of skins, all being used locally. Up to date no experiments had been carried out with goats in Dahomey, but it was hoped work would start soon.

No disease had been observed in Dahomey or the Ivory Coast, apart from a little piroplasmosis.

Captain Henderson spoke about the Red Sokoto goat, the skin of which commanded the highest price in the world. Every effort was being made to breed the red goats to the exclusion of other types and, to this end, castration was being practised on a large scale —40,000 animals were castrated last year. Male goats from Sokoto were being distributed to other places. The value of a good quality red goat skin was 3s. 6d., whereas others are valued from 1s. 6d. to 2s.

Mr. Stewart asked Captain Henderson if the Red Sokoto goat would do well in the Gold Coast, the latter replying that he did not think so, as even in Nigeria, when moved away from its Sokoto environment, the Red Sokoto goat deteriorated rapidly and its skin became coarse.

M. Gargadennec stated that Karakul (Astrakhan) sheep had been imported into the Sudan and that the crosses with Macina black (Merino) produced very fine black curly coats. The skins from half crosses fetched as much as £1.

M. Gargadennec mentioned that Large White pigs had been imported from France five years ago and had done well. They had been crossed successfully with native pigs. These pigs had been kept in Northern Dahomey—except one, which when sent to the south had suddenly died. Swine fever occurred in Dahomey nine years ago with high mortality. In the Ivory Coast, Yorkshire and Berkshire pigs had been used and it was found that Berkshire were the best. They had been crossed successfully with native pigs. Pigs were issued to schools. As regards disease, parasitic diseases were the most serious, and in certain parts of the country it was impossible to keep pigs owing to parasitism.

In Nigeria poultry improvement was carried out by the Agricultural Department.

M. Aillerie said that the Minorca, White Wyandotte, Rhode Island Red, Buff Orpington, Bresse (French) and catinaisis (French) were the breeds imported into the Ivory Coast; Rhode Island Reds were considered to be the most successful and most resistant to disease. Orpingtons had also proved to be good. Experiments had been going on for from two to three years. It was proposed to distribute eggs by aeroplane from Dakar.

Resolution.—More attention should be paid to Animal Husbandry and industries in animal products than has been paid in the past. These were considered to be of vast importance to all Africa.

Hides and Skins

Captain Henderson spoke of the trade in hides and skins and how very important it was in Nigeria. Over five million goat skins, one million sheep skins and one million hides, valued at £1,000,000, were exported last year. The Veterinary Department organised and controlled the scheme for hide and skin improvement to eliminate bad flaying and disease. Many skins and hides were ruined by bad flaying by the native in the past and it was now compulsory to flay properly and dry the hides and skins in proper sheds, built by the Native Administration at all markets. Each market had a special mark (stencil) and any hide or skin badly prepared could be traced and persons responsible were punished. The result was that there was a great demand in Europe and America for Nigerian hides and skins and the prices had increased. Skins were imported from Niger Colony.

So far nothing had been done in Dahomey or the Ivory Coast.

Resolution.—The industry is of such economic importance as to warrant more attention to and improvement of animal products and this should be undertaken by the veterinary departments.

. . . . .

Captain Henderson proposed a vote of thanks, in which M. Aillerie and M. Gargadennec joined, to the Gold Coast Government and Mr. Stewart. He hoped that in two years' time another Conference would be held in Nigeria.

A Lighter Note from our Postbag.—Recently a client was discussing with his veterinary surgeon the improvements he hoped to make to his cowshed. He intended getting the bricks from a "demobilised (demolished) house" and to modernise the cowshed by installing "tubercular (tubular) fittings."

ABSTRACTS

[**The Clinical Examination of Brood Mares for Pregnancy.** Dimock, W. W. (1936.) *Cornell Vet.* **26.** 4. 314-323.]

The procedure described for the examination of the mares comprises palpation of the generative organs per rectum and a vaginal inspection. An accurate knowledge of the anatomical position of the uterus and ovaries and their size, shape and texture in the normal non-pregnant mare is an essential preliminary. The indications sought per rectum are the tone and rigidity of the uterine wall and the presence of a bulge in one horn, indicative of the developing foetus. Vaginal examination is resorted to only where the indications per rectum are indecisive. An equine vaginal speculum is employed and attention directed to the appearance of the vaginal mucosa and the cervix. In 75 per cent. or more of pregnant mares the vaginal mucosa is pale, dry and gummy and the cervical seal most pronounced. The author claims that by these means an accurate decision may be arrived at from the thirtieth day onwards in a high percentage of cases. In some thousands of mares so examined no case of injury has resulted.

C. D.

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[**The Differential Diagnosis of Equine Abortion, with special reference to a Hitherto Undescribed Form of Epizootic Abortion of Mares.** Dimock, W. W., and Edwards, P. R. (1936.) *Cornell Vet.* **26.** 3. 231-240.]

The authors describe a hitherto unreported form of abortion in mares which they designate epizootic or virus abortion. Outbreaks were met with in Kentucky State, U.S.A., in mares which had been previously immunised against *S. abortivo-equinus* infection. Cultural studies failed to reveal the presence of any micro-organisms and transmission experiments carried out with bacterial-free filtrates or organs of aborted foetuses suggested the existence of a specific virus. The disease proved to be readily transmissible by contact, ingestion and through the medium of infected utensils.

The characteristic features of the disease were shown in certain tissue changes in the aborted foetus, particularly the presence of small, white degenerated areas in the liver. Differential diagnosis was based upon the *post-mortem* findings and the absence of organisms in the foetus combined with a negative reaction on the part of the mother to specific agglutinins for *S. abortivo-equinus*. The authors admit, however, that diagnosis must often be approached through a process of elimination of the other recognised forms of equine abortion, the essential characters of which are also given.

C. D.

[**Infectious Jaundice (Ictero-haemoglobinuria) in Cattle.** Gousseff, W. F. (1935.) *Arch. wiss. prakt. Tierhlk.* **70.** 1. 79-85; **71.** 2. 97-100.]

The first part of this paper describes an outbreak of a disease mainly affecting cattle, which, clinically, is similar to bovine piroplasmosis. In calves, the course of the disease is usually severe for four to seven days; the animals then either succumb or the condition becomes chronic, lasting two to three weeks. At the onset, there is high fever and general icterus; the urine is dark reddish-brown in colour. In the chronic stage, there is marked weakness; the skin commonly desquamates, especially around the ears. In adult cattle, similar symptoms are observed and the milk yield is diminished, the secretion often being red or yellow in colour.

The condition resembled in every way that described by various Russian workers as occurring in the northern Caucasus and which, it is suggested, is due to a spirochaete. The present workers were unable to demonstrate the presence of a spirochaete in the blood or organs of affected animals either in smears or by cultural methods. Treatment with various arsenical and bismuth preparations gave encouraging results.

In a second paper, further cases are described in calves, cattle and in two sheep. On the two farms affected, one-quarter of the total stock showed symptoms. *Post-mortem* findings included degenerative changes in the kidneys, an early necrosis of the intermediate zone of the liver lobules, and cloudy swelling of the heart muscle.

Prophylactic and curative treatment with atoxyl, salvarsan, novarsenol and bismuth preparations was tried. The authors conclude that early treatment of affected animals with atoxyl or novarsenol, accompanied by suitable symptomatic treatment, is successful in saving almost all affected animals. In the outbreak investigated, 10 per cent. of affected animals died or were slaughtered.

E. G. W.

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[**A Consideration of Urinary Calculi in Animals.** de Camp, C. E. (1936.) *Amer. Vet. Med. Assoc.* **88.** 1. 66-73.]

This is a review of some of the literature dealing with various aspects of urinary calculi. No original work is reported. In man, it is stated that urinary calculi in childhood are due mainly to continued dietetic errors, in middle age to infection, and in old age to urinary obstruction. In animals, it is suggested that special attention should be paid to the diet, *e.g.*, an adequate supply of vitamins, especially A and D, a correct Ca/P ratio and sufficient fluid intake. The opinion is expressed that the use of a ketogenic diet in animals might be of use

in treating urinary tract infection. Azamine is recommended as a reliable urinary bactericidal agent. [In this connection it would be of interest to study the bactericidal effect of mandelic acid in urinary affections in animals. This substance acts only in acid urine and must thus be preceded by or combined with an agent to render the urine acid. Acid sodium phosphate and hydrochloric acid have been shown to be of little value for this purpose. The ammonium salts, *e.g.*, chloride, are the only effective acidifying agents. Recently, ammonium mandelate has been used in man with excellent results. It is stated to be non-toxic for the dog and man and usually effectively renders the urine acid: it is generally combined in an elixir with extract of liquorice to render it palatable. It is not, of course, claimed that all cases of urinary infection respond to this treatment: the only other proved urinary antiseptics, hexamine and flavine, are also of great value. A ketogenic diet is also of considerable value in man. It acts not only by rendering the urine acid but by virtue of the bactericidal action of β-hydroxybutyric acid. It must be mentioned that mandelic acid preparations are expensive. For further details see *Proc. Roy. Soc. Med.* 1937. February. p. 501.]

E. G. W.

REVIEWS

Register of Veterinary Surgeons, 1937

The 1937 edition of the official Register of Veterinary Surgeons has just been issued from 10, Red Lion Square. It contains the names of 3,545 members, an increase of 18 on the Register for 1936. The total number of deaths recorded since the issue of the previous Register was 68, and two names were removed under the provisions of Section 5 (4) of the Act. The number of new graduates admitted during the year was 88, and the name of one member which had been removed by the Registrar was restored on appropriate application being made. The number of "Existing Practitioners" registered under Section 13 of the Act of 1881, is now 17, a reduction of one on the previous list. The number of Fellows of the College is 223 as compared with 227 in 1936, six names having been removed on account of death, and only two names being added. On the other hand the list of Diplomates in Veterinary State Medicine increased from 134 to 141.

The Register itself has been thoroughly revised as usual and brought up to date. The lists of whole-time officers in the various Government Departments and in counties and municipalities are growing year by year. There are 40 counties in England and Wales and 18 in Scotland where there are whole-time officers. Indeed, the only counties in England which have not yet appointed veterinary officers seem to be Cambridge, Hertford, Lincoln, Norfolk, Northampton, Rutland and Warwick. There are also eleven counties in Wales and 13 counties in Scotland which have no whole-time veterinary service.

The Register is a compendium of useful information which is of great value to any member who wishes to take an intelligent interest in the advancement of his profession.

The Register is issued free to all members on payment of the annual fee.

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[**Text-book of Meat Inspection.** By J. Drabble, B.V.Sc., pp. xv+353. 47 illustrations. Australia Book Co. (8vo.). Price 21s.]

There are many text-books on meat inspection intended chiefly for the use of sanitary inspectors and those engaged in the meat trade but, in the main, these have been written by authors having a very superficial knowledge of veterinary physiology and pathology, with the result that their readers are not afforded a logical understanding of the subject. Acquaintance with the needs of students for the meat certificate of the Royal Sanitary Institute and the Diploma of the National Meat Traders' Federation has convinced the reviewer that a knowledge of elementary physiology, anatomy and pathology of food animals is essential before a student can acquire a true understanding of the subjects of meat inspection or the "science of meat."

It is for these reasons, therefore, that we welcome this text-book as a valuable addition to the text-books available to lay students.

The book is divided into two main parts, one dealing with the elements of physiology and anatomy and the other with disease conditions.

The latter is naturally largely influenced by conditions obtaining in Australia and may appear rather unbalanced when regarded from the standpoint of meat inspection in Great Britain. A chapter is also included dealing with the preservation of meat.

This book is written in a clear and readable style, is well illustrated and we confidently recommend its use as a text-book to lay students and as a convenient guide to their teachers.

Lord Dawson of Penn has been re-elected President of the Royal College of Physicians.

REPORTS

[**Department of Scientific and Industrial Research**. Report for the Year 1935-36. Published by His Majesty's Stationery Office, London. Price 3s. net.]

It is an intellectual adventure to read this Annual Report for not only is one quickly transferred from one theme of interest to another but the extent of the world through which the reader is transported is so vast and yet so often impinges upon the commonplace of his everyday life that the journey is accomplished with the ease of holiday travel. Besides descriptions of the work of the 17 branches of scientific research such as the National Physical Laboratory, Fuel Research, Food Investigation, Geological Survey, Building Research, Water Pollution Research, Chemical Research, Radio Research, etc., that are controlled almost completely by the Department, an account is also given of the 20 Research Associations which have been developed in close collaboration with individual industries. The total expenditure of the Department was £787,186 of which £215,355 was recovered in the form of grants or fees from industry or other Government Departments. An interesting graph is given showing how the contributions from industry and the Department towards the Research Associations have varied since 1930. In that year industry gave about £97,000 and the Department subscribed £65,000, but in 1935, while the Department contributed £110,000 industry itself advanced £230,000. But even now industry has not secured all the help the Department is willing to give, for it has offered £81,000 per annum above the present total if other industries raise a satisfactory sum towards the cost of starting research associations of their own.

The basis of the organisation of the Department's research is firstly the selection of properly trained scientific workers, who are suitably chosen so that efficient teams of chemists, physicists, engineers and biologists are obtained, and secondly the maintenance of close contact with industry. The success of this plan is readily seen from a perusal of this Report.

At the National Physical Laboratory work on the standardisation of apparatus has been continued and many problems of diverse nature are receiving attention—as, for example, the properties of insulating materials and refrigerants at low temperatures, the effectiveness of materials to protect operators from X-rays, the invention of a suitable instrument to discover lost radium, methods to reduce sound in buildings, attempts to eliminate the personal errors of observers in colorimetry, etc. In the section on Food Investigation equally diverse problems are being examined. A few isolated facts reported may be mentioned. Protein in flesh foods has an anti-oxidant activity and so protects adjacent fat, which normally oxidises fairly rapidly, from deterioration. The changes that take place during the storage of eggs can be controlled to a very large extent if 2·5 to 5 per cent. of carbon dioxide is present. The recent work on quality of pork and bacon and how this is linked with the growth and diet of the pig is described. It is found that frozen fish will not keep at temperatures of −20° C. but can be preserved satisfactorily for months if frozen and quickly stored at −28° C. The flesh of the fresh water eel is an unusually rich source of vitamin A. The methods of refrigerated gas storage, which have proved so satisfactory with apples, have now been equally satisfactorily extended to pears.

The Water Pollution Board reports successful attempts to prepare base exchange materials from British clays that are suitable for water softening. A method is described of removing and subsequently assessing lead in water by its passage through alumina. Experiments have shown that it is a practicable proposition to purify milk washings, such as those discharged from milk collecting and distributing depôts, creameries and condensed milk factories, by biological oxidation either in percolating filters or by the activated sludge process. This investigation has drawn attention to the losses incurred in the discharges, about 0·75 per cent. of the milk handled being so lost. This can be reduced to 0·5 per cent., thereby saving to the industry an annual sum of approximately £50,000. Work on the activated sludge process of sewage purification shows that the biological oxidation is brought about primarily by bacterial enzymes. It would appear that the enzymes of both living and dead cells are active.

Research upon wool is again increasing, partly as a result of the uneasiness produced by the growing use of artificial fibres such as rayon. It becomes increasingly evident that the disulphide link plays an important part in determining the behaviour of wool and that it is to the properties of this chemical linkage that must be attributed some of the special characteristics of great value in manufacture such as temporary and permanent set.

Very many other interesting problems are discussed in this book but it is impossible to add more to this review. The report itself must be consulted to see the extent to which scientific and industrial research is now organised in this country. It is certainly good value for three shillings.

W. R. W.

[**Canada (Department of Agriculture).** Report of the Veterinary Director General for the Year 1935-36.]

The freedom of the Dominion from such serious diseases as foot-and-mouth disease, dourine, glanders, rabies, sheep scab and anthrax permitted concentration on tuberculosis eradication. As in the U.S.A., the general incidence of cattle tuberculosis is low and a system of eradication similar to that in use in the United States is being pursued. Already marked progress has been made. One province (Prince Edward Island) and portions of five others, embracing over half a million cattle, had been made accredited areas and approximately 30 per cent. of the entire cattle population was under observation within the scheme at the time of this report in March, 1936.

Bovine contagious abortion is described as a treacherous and widespread malady requiring more definite action than heretofore to bring it under control. Voluntary help by owners has not proved satisfactory. With a view to enhancing control measures the disease was brought under the provisions of the Animals Contagious Diseases Act during the year and regulations were passed providing for the permanent marking of cattle (a tattoo mark in the ear) which reacted to the agglutination test and the prevention of export of such animals. An area eradication plan run in conjunction with that of tuberculosis was under consideration at the time of reporting.

To comply with British regulations for the suppression of the warble fly, all cattle destined for export to that country were suitably skin dressed between March and June. Furthermore, all such cattle were subjected to the tuberculin test and the agglutination test for contagious abortion and only those that passed these tests were shipped. The total number exported to Great Britain during the year was 3,730.

Routine laboratory services occupied the major part of the time of the Pathological Division and thus curtailed research. Yet a large number of experiments were in hand, including investigations into diseases of fur-bearing animals, Johne's disease of cattle, contagious abortion, tuberculosis, bovine mastitis, bovine haematuria, and poultry diseases. A mere outline only of these activities is given. Of the data supplied the following deserve mention: Young cattle were successfully infected by feeding Johne's bacilli-laden intestinal mucous membrane taken from animals dying of Johne's disease. All animals so infected died between 17 and 32 months. The johnin test has been found unreliable. *Brucella abortus* as the cause of hygromas in cattle was further observed. The sites of production of brucella antibodies were discussed in a special publication elsewhere, but it is stated that while complement-fixing bodies are produced only in the blood, agglutinins are produced in the mammary gland as well as in the blood —a matter which has considerable bearing on the diagnosis of mammary infection. The B C G tests for tuberculosis immunity were suspended. A study is now being made of the significance of the tuberculous skin lesion of cattle but no results are given. Infectious bovine mastitis is being investigated from many new aspects and the results of the tabulated list of experiments mentioned should have far-reaching importance. An interesting account of the duration of infection in cattle with *Brucella abortus*, in three naturally infected herds, is given. The conclusions reached from continuous tests made over several years are: (1) The number of adult cattle which recover from infectious abortion as evidenced by the permanent return to a negative reaction by the agglutination test is approximately 3 per cent. (2) About 15 per cent. of infected calves remain permanently infected. The rest recover during immaturity. (3) Approximately 25 per cent. of infected adult cattle fluctuate between positive and negative reactions; that is, an infected animal may be negative at one test and positive at a succeeding one. The importance of this fluctuation of the agglutination titre of infected animals is apparent, since one negative reaction cannot be taken to indicate freedom from the infection.

W. K.

RABBITS AND GIN TRAPS

Sir Frederick Hobday, President of the University of London Animal Welfare Society, in a letter to the Press, states that the report of the Select Committee on Agriculture (Damage by Rabbits) offers somewhat cold comfort, whether to farmers who are forced to feed their neighbours' rabbits or to humanitarians who wished to see the total prohibition of the cruel gin trap at an early date. Nevertheless, he adds, the report contains some positive recommendations, and it is to be hoped that the Government will provide Parliamentary time for carrying them into effect as soon as possible.

The recommendations in question are: That county councils should have power to coerce those who fail to keep down rabbits; that persons who suffer damage from their neighbours' rabbits should be entitled to claim compensation; and that in no circumstances should gin traps be set in the open. Legislation to the foregoing effect will help both farmers and humanitarians if it is given such a form that it will be really effective in practice; otherwise it will be worse than useless. We must be on our guard against any new legislation which can be evaded as the existing law is evaded.

The committee also made the following three recommendations, which are excellent so far as they go: That county councils should maintain a rabbit-control service; that cyanide fumigation should be specifically legalised; and that the humane-trap problem should be officially investigated.

N.V.M.A. DIVISIONAL REPORTS

North of Ireland V.M.A.*

ANNUAL GENERAL MEETING AT BELFAST

The Annual General Meeting of the above Association was held in the Imperial Hotel, Belfast, on January 26th, 1937, at 7 p.m. Prior to the meeting the members were entertained to tea.

Mr. Gilmore, the President, occupied the chair and the following members were present: Messrs. Campbell, Cassells, Ewing, Finch, Foggie, Harper, Ewing Johnston, Kelly, Kerr, Lamont, Magowan, Moore, McAllan, McNabb, Rosborough, Russell, Shanks, Sim, Stewart and Stratford. The following visitors were also present: Messrs. Duncan, Ritchie, Thompson and Whyte.

Apologies for absence were received from Messrs. Taylor, W. S. Lamont and McConnell (Senior).

The minutes of the previous meeting were taken as read, having been published in the *Veterinary Record*. The minutes of the council meeting held since the last general meeting were read and passed.

Revision of the Rules.—The proposed amended rules which had been issued to all the members were discussed. Certain further alterations were made and the whole adopted unanimously. In connection with overdue subscriptions it was decided on an amendment that all those persons in arrears for three years or more should be notified of their lapse and be given until the next general meeting (spring meeting) to pay the arrears. Should such members fail to pay their arrears by the spring meeting they shall automatically cease to be members and shall not be eligible for re-election until the arrears have been paid.

Treasurer's Report.—Mr. Kelly's report was read and adopted. Again the Treasurer showed that the Association was in a sound financial position. Arising from the report it was decided to contribute £2 2s. to the Veterinary Benevolent Fund and £1 1s. to the National Horse Breeding Association.

Election of Office Bearers

President.—The proposition of Mr. McAllan that Mr. Gilmore be again asked to occupy the chair was loudly applauded. Mr. Magowan formally seconded the motion, which was carried unanimously. Messrs. Kelly and McAllan were elected *Vice-Presidents*. Mr. Kelly was re-elected *Honorary Treasurer* and Mr. Shanks *Honorary Secretary*.

Mr. Carruth was re-elected lay-secretary at the usual rate.

The following members were elected to the *Council* by ballot: Messrs. Magowan, Ewing Johnston and H. G. Lamont, for three years; Messrs. McConnell (senior), Finch and Gault for two years; Messrs. Monro, Ranson and Russell for one year.

Any Other Business

The following new members were formally proposed and seconded: Messrs. T. Dunn, Omagh; W. J. Thompson, Lurgan; W. Duncan, Stormont; A. A. Whyte, Stormont; F. Ritchie, Belfast.

The President proposed that foundation members should be made honorary life members of the Association. After being formally seconded, the proposition was discussed and it was decided that the matter should be looked into by the Council and brought up again at the next general meeting.

The programme of meetings for the year was discussed, it being eventually left to the Secretary to make the necessary arrangements.

The Treasurer announced that the collection box for the Veterinary Benevolent Fund, which had been handed round during the meeting, had collected £2 5s. 6d. It was proposed by Mr. Ewing Johnston, seconded by Mr. Lamont and agreed, that the collection box should be brought to every meeting of the Association.

This being all the business, the meeting ended with a vote of thanks to the President, Mr. Gilmore, for his excellent and entertaining chairmanship.

P. L. Shanks, *Hon. Secretary.*

*Received for publication March 4th, 1937.

* * * * *

Yorkshire Veterinary Medical Society*

ANNUAL SOCIAL EVENING AT LEEDS

The annual social event of the above Society took the form of a reception by the President followed by a dinner and dance which was held at the Guildford Hotel, Leeds, on Friday, February 26th, 1937. A company numbering about 125 sat down to dinner at 8 p.m. under the Chairmanship of the President, Major D. S. Rabagliati, O.B.E., B.Sc., F.R.C.V.S., D.V.S.M.

The principal guests of the evening were Captain Robert Simpson (President of the National Veterinary Medical Association) and Mrs. Simpson, and this was the first occasion on which the President of the parent body was able to attend. Mr. D. D. Canning (President of the North Midland Division) and Mrs. Canning, were also present as guests of the "Yorkshire." Others present included Mr. and

*Received for publication March 11th, 1937.

Mrs. W. Crawford and party, Lieut.-Colonel and Mrs. J. A. Dixon and party, Mr. and Mrs. A. H. Watson and party, Mr. and Mrs. W. R. McKinna and party, Mr. and Mrs. E. F. Hardwick and party, Captain and Mrs. J. W. Procter and party, Mr. and Mrs. A. J. McCarmick, Mr. and Mrs. A. D. J. Brennan and party, Mr. and Mrs. F. C. Scott, Mr. and Mrs. W. T. MacGregor, Mr. D. Corbett, Mr. and Miss E. Ackroyd, Major C. Holland and party, Mr. J. McKellar and party, Mr. A. Riggs, Mr. A. T. Adams, Mr. D. V. Sinclair and Mr. and Mrs. E. F. McCleery and party.

As is usual on these occasions, speech-making was reduced to the absolute minimum, and after the toast "The King," the President referred to the absence of a representative from the North of England Division and expressed the regret of the Society that Captain and Mrs. Rider, from whom a telegram had been received and who were to represent that Division, were unable to be present. He also acknowledged the receipt of a telegram from Mr. and Mrs. S. Vine of Kent, who were unable to attend. The President then welcomed the large attendance of members of the Society and their friends, referring particularly to the presence of the President of the National Veterinary Medical Association and Mrs. Simpson, who received a very hearty welcome.

The dinner, which was thoroughly appreciated by all, was followed by dancing to music supplied by "Priestley's" Dance Band and all those present enjoyed the evening's entertainment, which concluded at 1.30 a.m.

E. F. McCleery, *Hon. Secretary.*

In Parliament

Prior to the Easter Recess, the following questions and answers were recorded in the House of Commons:—

Milk Production

Captain Heilgers asked the Minister of Agriculture the number of cows in Great Britain in milk or in calf at the latest convenient date; their estimated production in gallons of milk; whether the gallonage represented by imported milk products is in excess of Home production; and, if so, to what extent?

Mr. W. S. Morrison: The number of cows and heifers in milk and of cows in calf on agricultural holdings of over one acre in Great Britain was 3,056,983 on June 4th, 1936. The production of milk (excluding milk fed to live-stock) in the twelve months ended on that date is estimated at approximately 1,587 million gallons. Average imports of milk products into the United Kingdom in the years 1935 and 1936 were equivalent to approximately 2,877 million gallons of liquid milk, representing an excess of 1,290 million gallons over home production.

Mr. Macquisten: Is not this importation due to the fact that the operations of the Milk Board have raised the price of fresh milk beyond the capacity of the people?

Mr. Morrison: No, Sir.

Notes and News

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

April 5th.—Last day for applications for tickets for R.C.V.S. Annual Dinner.

April 5th.—Meeting of the Society of Veterinary Practitioners at the N.V.M.A. Offices, 36, Gordon Square, W.C.1, 5.30 p.m.

April 5th.—N.V.M.A. Committee Meetings, at 36, Gordon Square, W.C.1: Editorial, 10.30 a.m.; Organising, 2 p.m.; Appointments, 3.30 p.m.; Finance and General Purposes, 4.30 p.m.

April 6th.—N.V.M.A. Committee Meetings at 36, Gordon Square, W.C.1; Parliamentary, 10 a.m.; Veterinary Officers' and Public Health, 11 a.m. N.V.M.A. meetings at the Connaught Rooms, Great Queen Street, Kingsway, W.C.2: Extraordinary General Meeting, 2.30 p.m.; Council Meeting, 2.45 p.m.

April 7th.—R.C.V.S. Committee Meetings.

April 8th.—R.C.V.S. Committee Meetings.

April 8th.—R.C.V.S. Annual Dinner, May Fair Hotel, Berkeley Street, W., 7.30 p.m.

April 9th.—R.C.V.S. Committee and Council Meetings.

May 6th.—Nominations for Election to R.C.V.S. Council due.

May 12th.—Coronation Day.

May 13th.—Entries for D.V.S.M. Examination due.

April 16th.—Meeting of the Mid-West Division, N.V.M.A., at Bath, 2.15 p.m.

May 19th.—R.C.V.S. Voting Papers issued.

May 27th.—R.C.V.S. Voting Papers to be returned.

June 3rd.—R.C.V.S. Annual Meeting.
Victoria Veterinary Benevolent Fund Annual Meeting.

June 10th.—D.V.S.M. Written Examination begins.

June 14th.—D.V.S.M. Oral and Practical Examination begins.

June 23rd.—R.C.V.S. Committee Meetings.

June 24th.—R.C.V.S. Committee Meetings.

June 25th.—R.C.V.S. Committee and Council Meetings.

July 5th.—R.C.V.S. Written Examinations.

July 6th.—R.C.V.S. Written Examinations.

July 8th.—R.C.V.S. Oral Examination begins.

July 26th-30th.—N.V.M.A. Congress at Bournemouth.

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Transference of N.V.M.A. Offices

Thirteen-and-a-half years of growth and progress at Gray's Inn, first at No. 10, Gray's Inn Square, and latterly at 2, Verulam Buildings, have now been succeeded by the commencement of a new era for the N.V.M.A. at its own House, 36, Gordon Square, W.C.1. On Thursday last our occupancy ceased of the chambers which have accommodated us hitherto and the formidable business of moving into the handsome building acquired by the Association and illustrated in our issue of February 6th, was successfully accomplished. Members—of committees, particularly—will appreciate the change from cramped quarters to the spacious new meeting room on the first floor, while the secretarial work, on the ground floor, and the editorial, on the second, will be carried on under greatly improved conditions.

A hearty welcome is extended to all members of the profession to view the new offices, for which purpose reference to the street map also published in our issue of February 6th, will be found of service.

* * * * *

R.C.V.S. Annual Dinner

There is just time for applications to be sent to the Secretary, R.C.V.S., 10, Red Lion Square, London, W.C.1, for tickets for the annual dinner to be held at the May Fair Hotel on Thursday next, April 8th, at 7.30 p.m. All those who wish to attend should apply at once in order to permit of the arrangement of the tables. A remittance of 13s. 6d. per ticket should accompany each application, and we may once more call attention to the fact that on this occasion lady guests are invited. The toast of the Royal College will be proposed by Sir Charles Howell Thomas, K.C.B., K.C.M.G., late Permanent Secretary to the Ministry of Agriculture, and the President, Mr. J. Willett, will reply. The well known artists, Mr. Sterndale Bennett and Mr. Fred Gregory, have been engaged for the evening, and we hope that every member of the College who can, will be present in support of the President and Council.

* * * * *

PERSONAL

We are glad to learn that Dr. Tom Hare, of London, and Professor W. M. Mitchell, of the Royal (Dick) Veterinary College, Edinburgh, have been co-opted to represent the veterinary profession on the Scientific Advisory Committee of the Empire Rheumatism Council—a friendly gesture to the profession which will be appreciated by all their colleagues.

The Empire Rheumatism Council has been formed under the chairmanship of Lord Horder for the following purposes: (1) To educate the public and professions in the chronic rheumatic group of diseases; (2) to encourage and initiate research into the causal factors and methods of treatment; (3) to co-ordinate existing facilities and to encourage the further provision of centres for treatment in co-operation with Government, local and charitable authorities.

H.R.H. the Duke of Gloucester, K.G., is President of this new organisation, the Organising Secretary of which is Sir Frank Fox.

. . . . . .

It is with much regret that we have to state that the improvement in the health of Miss Louisa Hunting, daughter of the founder of this journal, which we recorded in our issue of March 20th, has not been maintained. Miss Hunting has been removed to her home from the Princess Beatrice Hospital after a long observational stay, and can see no visitors.

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R.C.V.S. OBITUARY

Gordon, Thomas, M.C., Mohill, Co. Leitrim, I.F.S. Graduated July 22nd, 1912, Dublin. Died March 21st, 1937.

McInnes, Benjamin, P.O. Box 455, Charleston, S. Carolina, U.S.A. Graduated April 10th, 1880, Edinburgh (H. and A.S., 1874). Died March 5th, 1937; aged 85 years.

. . . . . .

Mr. Benjamin McInnes, M.R.C.V.S.

Mr. Benjamin McInnes, of Charleston, practised his profession in his native city and State for more than 60 years. He early attained prominence in his chosen field and at the time of his death was one of the two oldest members of the American Veterinary Medical Association, which he joined in 1876, while he was a life and charter member of the Southern Veterinary Association. For a number of years he served South Carolina as State Veterinarian with great ability.

Mr. McInnes's father, Benjamin McInnes, went to Charleston, South Carolina, more than 100 years ago, as a young man from Muthill, Perthshire, Scotland. In the absence of graduate veterinarians, "Massah Ben"—he employed as many as eight horseshoers, all slaves—he became the leading practitioner of the Low Country of South Carolina, and from him his son learned horseshoeing and veterinary medicine. Not content to be a veterinarian without a scientific, as well as a practical, training, the younger Benjamin attended classes in the Charleston Medical College and spent two years in Scotland, first at Dick's Veterinary School in Edinburgh, under Professor Williams, and following this great teacher when he established the New Veterinary College. He took the Highland and Agricultural Society's Veterinary Certificate in April, 1874, and in 1880 he applied for and secured admission as a member, R.C.V.S., under the provisions of the Charter of 1879. After his father's death, he continued as proprietor of the blacksmith shop and practitioner at Charleston, soon becoming the first State Veterinarian of South Carolina and later Vice-President of the A.V.M.A.

As one of the founders of the South Carolina Association, he served as President of this and officer of other southern veterinary associations, member of his State's examining board and was regarded by the increasing number of graduates in practice in South Carolina, as the Dean and "Grand Old Man" of the profession there.

Mr. McInnes married his cousin, Mary Palmer Kater, of Philadelphia, whose mother, like his own, was born at Kidd, nearby his father's home in Scotland. His eldest son, named George Fleming, after the great English veterinary surgeon, was unfortunately fatally injured in an automobile collision in 1928. "Doctor Fleming" as he was known throughout South Carolina, in spite of a crippling injury in childhood, was at once one of the most skilled and scientific

exponents of veterinary medicine and surgery and a skilful surgeon, urologist and pioneer in X-ray photography. He learned veterinary practice as a child (as did his father before him) and continued as "consultant" to his father and younger brother, after graduating from the Charleston Medical College and engaging in medical practice. Benjamin Kater McInnes, M.D., Charleston and V.M.D., University of Pennsylvania, continues the veterinary practice in the third generation, as well as carrying on his brother's medical specialities, and his eldest son, in turn, is a student in the Charleston Medical College.

Mr. McInnes is survived also by his daughters, Anna Belle, who conducts a most successful kindergarten and primary school for Charleston children; Mary Elizabeth, who married Emlen Wood, V.M.D. of Philadelphia, and Mary Palmer, who married T. Hutson Martin, M.D. of Charleston, his daughter-in-law, Mrs. Ruth Ward McInnes, and nine grandchildren.

As a life-long member of the First (Scotch) Presbyterian Church, Mr. McInnes served for years as Elder. He was laid to rest, after services in his beloved church, beside his wife, son and parents, in Magnolia Cemetery.

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LADIES' GUILD DANCE

It is with much pleasure that we record that, despite the set-back of postponement necessitated by the influenza epidemic, entire success attended the dance held under the auspices of the Ladies' Guild, at Princes Galleries, Piccadilly, W., on the evening of Wednesday, March 17th. There was an excellent attendance of members of the profession, their ladies and other supporters of the admirable object in view—to augment the financial resources of the Victoria Veterinary Benevolent Fund. As a result, the company of over 120 spent a most enjoyable time and Mrs. Nickinson, the Hon. Secretary of the Guild, and her committee are in the happy position of being able to transmit to the Fund the handsome sum of £31 10s.

* * * * *

"DICK" COLLEGE EXTENSION FUND BALL

Nearly 600 guests attended this picturesque and highly successful function, which was held in the Edinburgh Assembly Rooms, on March 19th, the eve of the Calcutta Cup match. Military uniforms and gay clan tartans played an important part in the vivid colour scheme presented, while the ladies added to an attractive scene with pastel-tinted dresses and clan tartan sashes.

The ball had a distinguished list of patronesses, among whom were the Duchess of Atholl, the Duchess of Buccleuch, the Duchess of Portland, and the Duchess of Roxburghe, while Lady Elphinstone, Chairman of the Ball Committee, was assisted in organising the dance by Lady Whitson, Mrs. Murray of Geanies, Lord Nigel Douglas Hamilton, the Hon. David Balfour, Major D. W. Hunter-Blair, and Mr. J. F. Colville, with Dr. O. Charnock Bradley, Principal of the College, as Vice-Chairman.

* * * * *

ARMY VETERINARY SERVICE

Movements of Officers

Lieutenant R. S. T. Bowden, who did duty on board a freightship conveying animals from Egypt to China, has been posted to Hong Kong for duty, with effect from the date of arrival there, *viz.*, March 9th.

Captain A. A. Kidd, who has been on leave ex-India, joined at Aldershot for duty on March 17th.

Major G. Williamson, O.B.E., assumed duty as Instructor and Bacteriologist at the Royal Army Veterinary School, on March 22nd, *vice* Major A. A. Pryer, D.S.O.

The following moves took place on April 1st: Major H. D. Lewis, from Bordon to Catterick; Major W. M. Rouse, from Newport, Mon., to London; Major E. O'Kelly, from Colchester to Exeter.

The following officers are at present in this country on leave ex-India, *viz.*, Major R. C. G. Thwaytes and Major J. S. Keane.

London Gazette—War Office—Territorial Army

March 23rd.—Maj. W. S. Lornie, M.C., T.D., to be Lt.-Col. (Jan. 20th).

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LONDON VAN HORSE PARADE

The Inner Circle at Regent's Park was once again the rendezvous of many holiday makers on Easter Monday, the attraction being the Van Horse Parade, which continued to bear witness to the Londoner's love of the horse.

Total entries numbered 491, comprising 442 single horse vans, 45 pair horse vans, and four led horses, making 536 horses altogether. This number was a little smaller than the total last year, but this was said to be due to the inclement weather of late, which had dissuaded some drivers from competing out of fear that the condition of their horses would fall short of the high standard shown in the parade. The judging commenced at 9.30 and continued throughout the morning, with the presentation of prizes at 1.30. Mr. Bertram W. Mills drove to the show with his four-in-hand, and made the presentation, being received by Lady Daresbury and other officials. A sum of £450 was given in prizes, and in addition special awards were made by the Royal Society for the Prevention of Cruelty to Animals and Our Dumb Friends' League.

Lady Daresbury presided at luncheon in the absence of Lord Daresbury through indisposition.

Major G. de Chair, one of the judges, proposed the toast of "The London Van Horse Society." He said that, as a lover of horses himself, he felt sure that the drivers who were competing in the parade must derive a great deal of happiness out of their bond of friendship with the horses in their charge. Figures that the Society had produced, coupled with the experience of many prominent firms in London, proved, he thought conclusively, that the light horse van was an economical unit in business. Where it was a question of work in congested streets within a radius of eight miles, with a series of short journeys, the figures seemed to prove that the light horse van was a business proposition. Moreover, there was no greater value in advertisement for a firm than a well-turned-out horse and van. The presence of the horse in the streets of London had a very beneficial effect on the national character; it had a humanising effect on the population.

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HUNTER, THE GREAT RESEARCHER

Inasmuch as John Hunter played a very considerable rôle in the foundation of veterinary education in this country and his methods were essentially those of a comparative pathologist, we feel that our readers will find of interest the following abstract (*Lancet*, March 6th, 1937)

of Lord Horder's recently-delivered Hunterian Oration.

"Hunter was not *only* a surgeon—it might sound invidious if I said 'not a *mere* surgeon'—he was a physician also, and a better physician in many respects than some of his contemporaries who practised in that branch of medicine. But more than either of these two things he was, first and foremost, a pathologist, in the best, and in the only true, sense of that word—a man who sought out the causes and the nature of diseases. He was also, as we know, a great anatomist and physiologist, and he made these two fields of research so wide that they embraced the whole animal kingdom. Hunter's anatomy and physiology were, as we term it, comparative as well as human. I suppose no man ever spread his net wider than he did in his effort to read a little in Nature's infinite book of secrecy. What he was after, however, and the little (as he would have thought it) that he did was bound up with pathology, a branch—shall I not say the root?—of surgery which, before him, scarcely existed. Even the physician's branch of medicine had precious little real science to support it, so that the whole of medicine gained greatly through Hunter's work.

Technician and Philosopher

"Sir D'Arcy Power, in his Hunterian Oration before the Royal College of Surgeons of England, used the phrase 'the Hunterian tradition' by which to express a dual legacy left by Hunter to our profession—namely, his technical and pathological trend which he gave to the study of surgery, and it was the latter part of his dual legacy with which I will deal, disclaiming any intention of estimating Hunter's technical ability as surgeon. I am convinced that whatever the degree of his technical skill, this was of far less moment as a gift to humanity than the opening up of that vast field of observation and investigation in pathology which laid the foundation for the surgery of the future. It does not appear that he himself introduced much by way of new operations, nor laid down new principles by way of surgical technique. The one great exception to this statement is his method of curing aneurysm of the popliteal artery. This was a much more common disease in his day than it is in ours, and before Hunter the current surgical treatment was to tie the dilated vessel above and below the sac and so obliterate it. Hunter, relying upon the adequacy of the collateral circulation in the leg below the knee, introduced the method of tying a single ligature round the artery in the thigh and allowing the aneurysm to shrink. This operation, said to have 'saved thousands of limbs and lives,' spread Hunter's fame more than anything else that he did, for it quickly superseded the old operation all over Europe. Its introduction was the direct result of work in many fields; in it he united a whole multitude of facts from anatomy, physiology, clinical experience, *post-mortem* examinations, and experiments on animals. Surgery before Hunter—what was it? The same old system that the Egyptians knew—making holes to let the evil spirits out. Phlebotomy was no more, purges and clysters—called by another name to-day—have carried on the same notion, but for evil spirits read 'auto-intoxication.'"

Lord Horder then pointed out that after Hunter a great change took place in the studies of surgeons who, following him in the pursuit of science, became the chief anatomists equal as physiologists and pathologists with the physicians, who had previously held the scientific field. Undue stress, he thought, seems to have been laid upon whether Hunter proceeded in his researches mainly by deduction or by induction, while the conflict of philosophical methods led to confusion of thought and obscurity of language. The known tendency of the Scotch thinker is, he said, to proceed deductively and of the English thinker to proceed inductively; and it seems to have been assumed that the Scotsman working in London would find his native mental equipment embarrassed. Experience, of which there is quite a considerable amount, does not support this view. "It is idle to speculate what would have happened if Hunter had gone to a Scotch University and had been 'educated.' One possibility is that medicine would have lost John Hunter and been so much the poorer. He was, of course, chiefly inductive in his methods." The orator pointed out that Plato, Aristotle, Hippocrates, Galen, and Celsus, in sequence, had followed the deductive method, constructing dogmas and theories from the most meagre facts, and he suggested that the systematic reform of medical philosophy dated from Bacon as "an intelligent attempt to place the investigation of nature on a solid foundation." Hunter's excursions into deduction, he said, led to no scientific advance.

"But in induction he did much better. He anticipated the 'recapitulation theory' of Haeckel by pointing out that the embryo in each successive stage of its existence resembles the completed form of some lower order than itself. He concluded from a large number of studies that abnormalities are an expression of arrested development. He seemed also to anticipate Darwin in his teaching that structure is the ultimate expression of function and not *vice versa*. He was fond of teaching that the blood is alive, and though, here again, he seems to be flirting with an old, *a priori* vitalistic speculation, he seems nearly to have stumbled upon a very modern conception. And he got as near to Pasteur and Lister, from sheer experimental evidence, as to say that 'air of itself has no power to excite inflammation.' But though these examples show that Hunter was capable of taking the results of his inquiries into general conclusions, he was chary of doing so. As for abstractions which sought to take the place of demonstrable facts, his well-known advice to his pupil, Jenner, sufficiently repeats his own favourite method. 'Don't think—try; be patient, be accurate.'"

Jenner and Hunter

Lord Horder gave an interesting account of the close association between Jenner and Hunter, based on the long correspondence which took place between them, which he said epitomised the spirit, the tenacity, and industry of Hunter. In these letters Jenner was thanked for his experiments with a hedgehog but urged not to ask questions but to try experiments, the problems put before him being so varied as the natural history of a cuckoo, the breeding of toads, the nesting of birds, the temperature of vegetables—"Have you large trees of different kinds that you can make free with? If you have, I will put you upon a set of experiments with regard to the heat of vegetables"—again, "Have you any eaves where bats can go at night? If you have, I will put you upon a set of experiments concerning the heat of them at different seasons." "Have you got the bones of a large porpoise? Is ever the salmon spawn seen after she has parted with it?"

In the course of this correspondence with Jenner it became known to Hunter that Jenner had in some way lost the affections of the "woman of fortune" on whom he had set his

hopes. Hunter's condolence, and also his effort at consolation, are both characteristic. . . . "I own I was at a loss," he writes, "to account for your silence, and I was sorry for the cause. I can easily conceive how you must feel, for you have two passions to cope with, that of being disappointed in love, and that of being defeated; but both will wear out, perhaps the first soonest . . . but 'let her go, never mind her.' I shall employ you with hedgehogs . . . get a hedgehog in the beginning of winter, and weigh him; put him in your garden . . . then weigh him in the spring and see what he has lost."

The Hunterian "Tradition"

Lord Horder continued: "And so, after just 200 years, the tradition comes down to *us*. What are we doing with it? Are we carrying it on? *Can* we carry it on? For that is what matters. Institutions are doing their utmost to carry it on. This Society, as I have remarked; the College of Surgeons, with its great museum—'Hunter's monument,' as the President called it last week—where Wren's telling epitaph would be singularly apt—the enlarged laboratories, the Buckston Browne experimental farm, with its increased equipment, and capable of almost indefinite extension. . . . But what of *us*, the individuals: how is it with *us*? (1) Have we Hunter's power of concentrated industry? Someone has said that genius is as much a matter of perspiration as inspiration, and he must surely believe that if genius is not an infinite capacity for taking pains, at least it takes a genius to exercise this rare quality. I think some of us do possess this power of dogged, persistent effort. When I watch some of my colleagues who are in the van of research at their work I feel ashamed of the laziness of my own mind, the readiness with which it lets go its task, and the ease with which it yields to discursiveness. (2) Have we Hunter's inquiring mind, his lust to know, for the sake of knowing? (3) Have we his intellectual courage? Or do our minds run away when the struggle goes against us? (4) Have we Hunter's spirit of accuracy? Are we, as he was, filled with a divine discontent with any proof except that which carries an inescapable conviction? Remember those cuckoos' stomachs, those hedgehogs—more and more must be examined until the fact we are seeking cannot be avoided. (5) Are we, perchance, saying there is so little left to find out? We know all about hedgehogs—*or do we*?

"We are in a different part of the field, of course, for the pioneers have made a tremendous clearance. But there is probably still as much to be done as ever, though of a different kind. Or do we think that because we are so specialised in our several spheres, and research is therefore much more intensive, our problems are less surmountable than those which Hunter set himself? Tracking down 'elementary bodies' would seem, on the face of it, to be a more stubborn task than discovering the lymphatic system. Heading off a pandemic of influenza, with its almost elemental ravages, and getting its precursors and its 'trailers' and 'settings' accurately taped, seems work for gods rather than mere men. So much easier still to talk about 'epidemic constitutions' and leave it at that. Recognising clearly the factors which go to make a balance, or an 'imbalance,' in a man's hormones, and getting control over this delicate adjustment—surely Hunter never had a task which was the like of this? Solving the riddle of the endocardial infection. Understanding the mechanism of high and of low arterial pressures. Diagnosing cancer before as yet it yields what we call 'physical signs' or suggests its presence by recognisable deviations from the average in the radiologist's shadow-pictures. Determining sex. Preventing a whole heap of diseases which, once established, we cannot cure."

The Stress of To-day

The orator concluded by pointing out that these problems were for us to-day. "We have a corpus of knowledge to draw upon, completely hidden from Hunter, but are deflected by the domination of the age. Life has us by the throat. We are caught between instinct and reason; we have let go the former but we have not yet got a sure hold upon the latter; we are no longer savage nor are we yet sapient. To 'the intruding rabble of men, and books, and institutions' that broke in upon Emerson's peace we now add a host of new distractions and disturbances. What are we going to do about it? Are we also going to become a mob or are we going to maintain our intellectual freedom? To carry on the Hunterian tradition we must take to heart the Sage of Concord's warning: 'Let us not rove, let us sit at home with the cause . . . at times the whole world seems to be in a conspiracy to importune you with emphatic trifles. Friend, client, child, sickness, fear, want, charity, all knock at once at thy closet door, and say—"come out unto us." But keep thy state; come not into their confusion.' A few men and women are, I think, bent upon doing so. Unlike 'those who went upon the Holy Quest' they are not 'lost in the quagmire' nor do they follow 'wandering fires.' If only the politicians can keep the ring for them. God help them to do so! I suppose politicians do *know* how important these things are, how vital to all of us and to the future? When Pitt was approached with the object of getting the government of his day to purchase Hunter's unique collection of specimens he is reported to have said: 'What! Buy preparations? Why I have not money enough to purchase gunpowder!' History repeats itself. At first thought it would seem foolish to grudge the exchange of scientific inquiry for bombing planes, seeing that others have decided that if it is to be guns *or* butter then it is to be guns. But at second thought comes wisdom, and we remember that even dictators are transient, if not trivial, whereas these other things are eternal. Surely it is better to know the behaviour of a cuckoo's stomach than to organise a nation for war? Dr. Johnson once said that 'the man who is growing great and happy by electrifying a bottle wonders to see the world engaged in the prattle about peace and war.' The thought is the same (and I have the satisfaction of knowing that on this occasion I had expressed mine before I came across Dr. Johnson's). I feel quite sure that if John Hunter were amongst us to-day he would risk the same charge of simplicity or of impertinence as did Johnson's physicist. Nor would he be ashamed if the gas-bomb found him so occupied.

"Cannot you *see* this little man (Hunter stood 5-ft. 5-in. in his boots) with his shock of red hair, his exuberant vitality, his restless curiosity, making his attack upon the new world of facts, probing, measuring, comparing, his tools so rudimentary, his methods all his own, 'grappling Nature,' laying her under tribute, wrestling with her like Jacob with the angel, and saying, as Jacob said, 'I will *not* let thee go except thou bless me.'

"Let us imagine he *is* here, as indeed he is, living on amongst us in the tradition that he left behind him. Let us be worthy of him and of it."

Correspondence

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The views expressed in letters addressed to the Editor represent the personal view of the writer only and must not be taken as expressing the opinion or having received the approval of the N.V.M.A.

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THE LATE MISS CUST

To the Editor of the Veterinary Record

Sir,—There must, I am sure, be many members of the profession who will support the suggestion originally put forward by Mr. P. J. Howard, of Ennis, and supported by lady members in your last issue, that some tangible memorial shall find an honoured place in the archives of our profession to the memory of Miss Aleen Cust—and there could be no position where it could be more suitably placed than in the Council Chamber of the Royal College of Veterinary Surgeons.

It would, however, as Mr. Howard suggests, be especially appropriate if the matter was taken in hand by the women graduates and women students at present in the College—of whom altogether there are now considerably more than 100—and if each subscribed the amount suggested there would be sufficient to fulfil the purpose of a suitably inscribed memorial plate to the name of the woman whose tact, skill and dogged perseverance, made their present career possible.

Yours faithfully,
Frederick Hobday.

31, Argyll Road,
Kensington,
London, W.8.
March 23rd, 1937.

TUBERCLE-FREE COWMEN

To the Editor of the Veterinary Record

Sir,—In your last issue you quote Dr. W. T. Munro on tuberculous cowmen.

I presume that there is likely to be universal agreement with such of his remarks as you have actually quoted in full. It would, however, be a difficult matter to obtain enough tubercle-free cowmen for tested herds, as the vast majority of people seem to give a definite reaction to tuberculin. In this district the supply of cowmen of any sort is limited. It should be sufficient to prove that they are not excreting tubercle bacilli, *i.e.*, "open" cases.

I have often wondered how many infections in clean herds have been caused by men passing the infection on to the cattle. I once came across a fairly definite case where reactors appeared in a tested herd after a fresh cowman (who looked decidedly tuberculous) came on the premises. After he left reactors ceased to appear. It would have been interesting to have typed out the man's infection.

If cows are capable of picking up even a passing infection from hens, I do not see why cowmen, excreting either human or bovine type bacilli, should not be a considerable source of trouble.

Yours faithfully,
A. J. Baxter.

Downington House,
Lechlade,
Gloucester.
March 27th, 1937.

Last year Britain imported from Belgium 3,211 horses valued at £120,386, and from Holland 507 horses valued at £23,603.

Diseases of Animals Acts

SUMMARY OF RETURNS

Period.	Anthrax.		Foot-and-Mouth Disease.		Parasitic§ Mange.		Sheep Scab.	Swine Fever.	
	Outbreaks confirmed.	Animals attacked.	Outbreaks confirmed.	Animals slaughtered as diseased or exposed to infection.	Outbreaks reported by the Local Authorities.	Animals attacked.	Outbreaks confirmed.	Outbreaks confirmed.	Swine slaughtered.
	No.	No.	No.	No.	No.	No.	No.	No.	No.
Period 1st to 15th March 1937	36	43	—	—	11	13	5	51	31
Corresponding period in									
1936	27	34	—	—	12	42	7	61	60
1935	19	19	1	346	5	6	15	73	36
1934	16	16	—	—	5	7	19	72	52
Total 1st January to 15th March, 1937	155	177	3	262	53	83	88	250	148
Corresponding period in									
1936	122	153	4	379	46	159	113	434	277
1935	96	105	22	4,691	48	66	135	337	136
1934	101	101	—	—	59	99	264	363	209

Note.—The figures for the current year are approximate only.

§ Excluding outbreaks in Army Horses.

N.V.M.A. CONGRESS AT BOURNEMOUTH

Accommodation

THE ROYAL BATH HOTEL has been fixed as the venue for the Annual Banquet and the President's Reception. A very limited number of rooms at prices from 21/– to 27/6 per day are being reserved for Members and **EARLY** booking is essential. Below are given details of other recommended Hotels with the Special Terms offered to Members.

Name and Situation.	Terms to Delegates.		No. of Bedrooms (as indication of size of Hotel).	Remarks—Key to Letters. A.—H. & C. in bedrooms. B.—Electric fires in bedrooms. C.—Bedrooms with private bathrooms. D.—Lift. H.—Tennis Courts. E.—Garage. I.—Private Grounds. F.—Billiards. J.—Night Porter. G.—Beach Bungalow. K.—Private Suites.
	Full Session.	Per Day.		
*Royal Bath		21/– to 27/6		
Berkeley Hall, Cliff Cottage Road	3½ to 4 gns. per week		37	A. B. E. G. J.
*Bournemouth Hydro, Durley Gardens		12/6	57	A. D. F. J.
Brownswood Hall, Southcliff Road		15/–	48	A. B. D. E. F. G. I. J.
*Burlington, Owl's Road, Boscombe		17/– to 21/–	150	A. C. D. E. F. G. H. I. J. K.
*Central, The Square		17/6	40	A. D. E. G. J.
Court Royal, Southcliff Road		17/– to 18/6	32	A. B. C. I.
Dalkeith, Old Christchurch Road		15/–	40	A. G. J. K.
Embassy, East Overcliff Drive	5 gns. per week		30	A. B. C. D. E. G. I. K.
*Royal Exeter, Exeter Road		22/6	55	A. C. D. E. F. G. I. J.
*Grand, Fir Vale Road		19/–	200	A. B. C. D. E. F. G. I. J. K.
Gresham Court, Grove Road		12/–	40	A. E. I.
Hawthorns, West Cliff Road		13/6	70	A. B. D. E. F. H. I. J.
*Highcliffe, West Cliff		16/– to 18/–	100	A. B. C. D. E. F. I. J. K.
*Imperial, East Cliff		18/–	100	A. B. C. D. E. I. J. K.
Langham, East Cliff		12/6	43	A. B. E. G. I.
Marsham Court, Russell Cotes Road		18/– to 21/–	110	A. B. C. D. E. F. H. I. J.
Melford Hall, St. Peter's Road		15/–	45	A. B. D. E. F. G. H. I.
*Metropole, The Lansdowne		18/6	90	A. B. C. D. J. K.
Meyrick Cliffs, Beacon Road		15/–	45	A. B. D. E. F. G. H. I.
*Norfolk, Richmond Hill		18/– to 25/–	70	A. B. C. D. E. F. G. I. J. K.
Osborne, Exeter Road		15/6	33	A. E. F. I.
Pavilion, Bath Road		12/6	30	A. E. I.
Pine Court, Gervis Road		12/6	25	A. B. E. G. H. I.
Priory, Exeter Road		15/6	28	A. B. E. I.
Regent Palace, South Cliff	50/–	13/6	50	A. B. D. E. F. K.
Rochdale, West Cliff		15/–	30	A. B. C. I.
Rosstrevor, Priory Road		12/6	16	A. B. E. I.
Russell Court, Bath Road		12/6	40	A. D. E. I. J.
Southcliffe, West Cliff		16/6 to 21/–	40	A. B. E. F. I. J.
Tollard Royal, West Hill Road	£3 to £4		100	A. B. C. D. E. F. G. I. J. K.
Towercliffe, South Cliff		13/6	28	A. B. D. E. F. G. J.
Tralee, St. Michael's Road		12/6 to 14/6	50	A. B. D. E. F. G. I.
Walmer, Exeter Road		12/6	38	A. E. F. G. K.
Whitehall, Central Gardens		13/6 to 16/6	60	A. B. D. I.
Savoy, West Hill Road		15/– to 18/–	100	A. B. C. D. E. F. G. I. J. K.
Meyrick Court, East Cliff		13/6	30	A. B. D. E. G. I. J.
Glenroy Hall, West Cliff		15/–	84	A. B. F. G. J. K.
Branksome Towers, Branksome Park		21/– to 30/–	—	—

* Licensed Hotels.

The Majestic Garage, Westover Road, Bournemouth is centrally situated for the Pavilion, Town Hall, etc. Members desiring garage accommodation should apply to the Manager for special terms.

As the Congress is being held at a very busy season, Members must realise that Accommodation should be Reserved **WITHOUT DELAY.**